



Service Manual



The photo shows the model KPX-660.

ORDER NO.
CRT1053

COMPONENT CAR STEREO CASSETTE DECK

KPX-660

KPX-440

EW

EW, ES

Note:

- See the separate manual CRT-467 for the cassette mechanism description.

SPECIFICATIONS

General

Power source	14.4 VDC (10.8 – 15.6 V allowable)
Grounding system	Negative type
Dimensions	180 (W) × 50 (H) × 150 (D) mm
Weight	1.2 kg
Tone controls (bass)	±10 dB (100 Hz)
(treble)	±10 dB (10 kHz)
Loudness contour	+10 dB (100 Hz), +7 dB (10 kHz) (volume: –30 dB)
Maximum output level	200 mV
Output impedance	1 kΩ

Tape Player

Tape	Compact cassette tape (C-30 – C-90)
Tape speed	4.76 cm/sec. (+0.14 cm/sec., –0.05 cm/sec.)
Fast forward/rewind time	Approx. 100 sec. for C-60
Wow & flutter	0.09% (WRMS)

Frequency response (KPX-440)

Metal	30 – 19,000 Hz (±3 dB)
Normal	30 – 16,000 Hz (±3 dB)

Frequency response (KPX-660)

Metal	30 – 20,000 Hz (±3 dB)
Normal	30 – 17,000 Hz (±3 dB)

Stereo separation

45 dB

Signal-to-noise ratio (KPX-440)

Dolby NR IN	63 dB (IEC-A network)
Dolby NR OUT	55 dB (IEC-A network)

Signal-to-noise ratio (KPX-660)

Dolby C-type NR IN	70 dB (IEC-A network)
Dolby B-type NR IN	63 dB (IEC-A network)
Dolby NR OUT	55 dB (IEC-A network)

Note:

Specifications and the design are subject to possible modification without notice due to improvements.

- Dolby and the double-D symbol are trademarks of Dolby Laboratories Licensing Corporation.
- Noise Reduction System manufactured under license from Dolby Laboratories Licensing Corporation.

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1. PARTS LOCATION

NOTE:

- For your parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.
- ★★: GENERALLY MOVES FASTER THAN ★.
This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- Parts marked by "◎" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

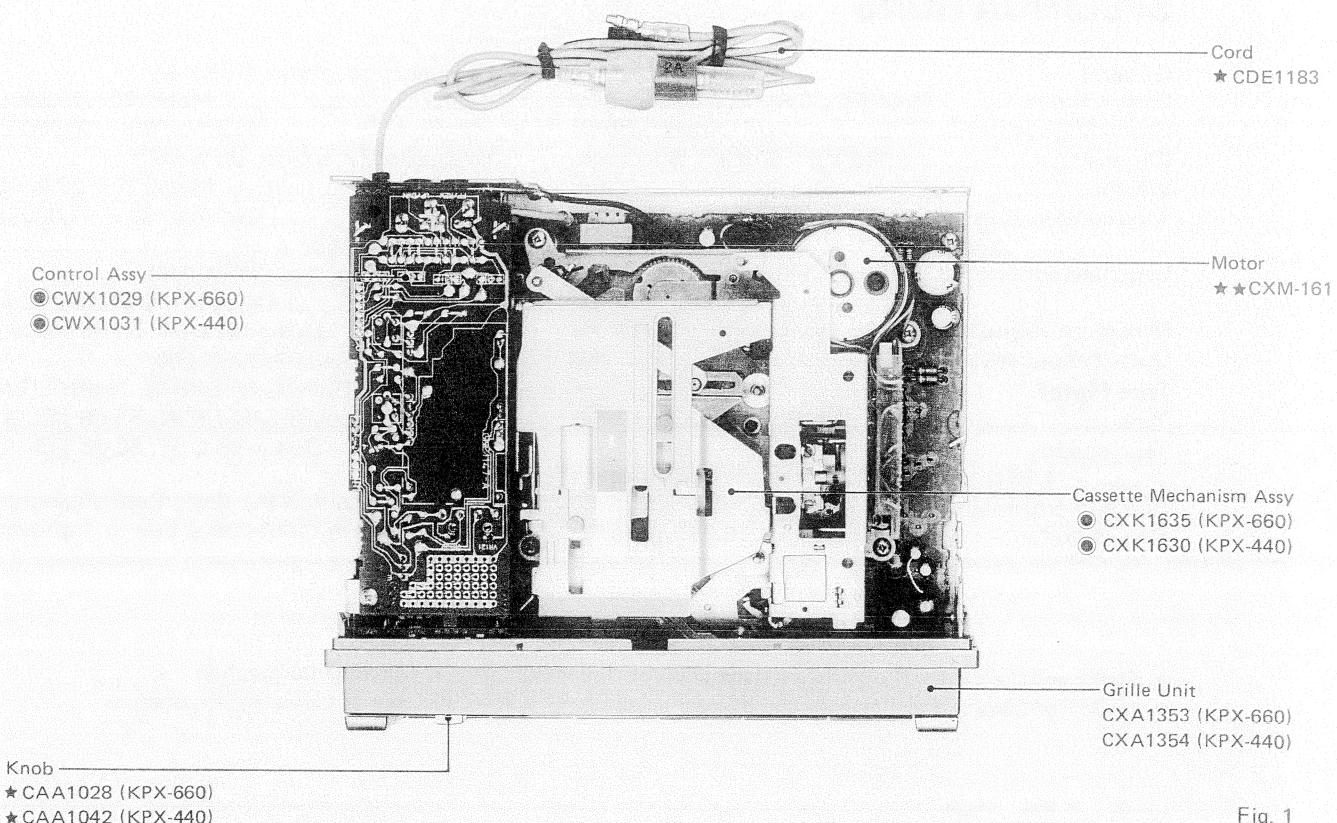
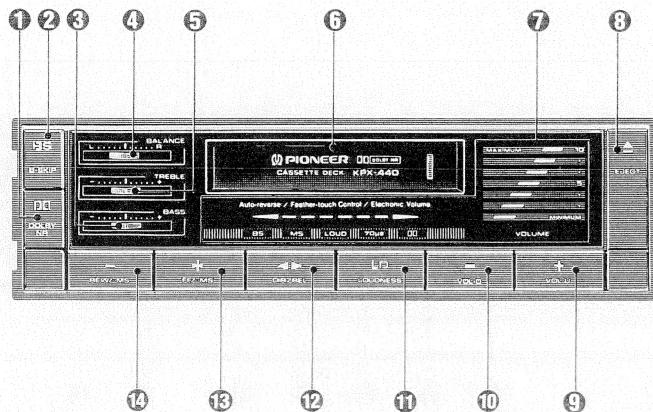
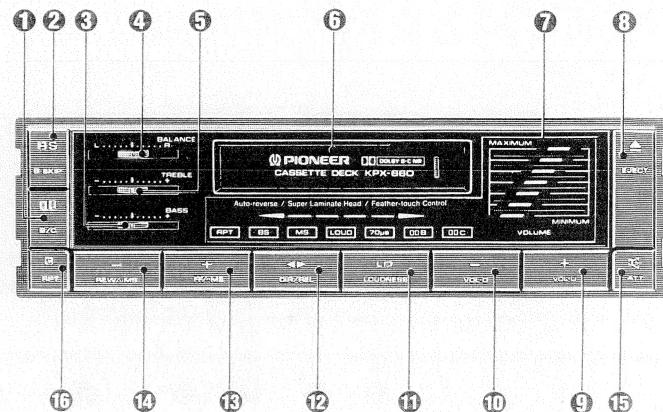


Fig. 1

2. NOMENCLATURE AND USE



KPx-440



KPx-660

Fig. 2

Fig. 3

① Dolby NR Button

KPx-440

Press when playing a tape recorded with a Dolby NR. ( lights on the display.)

KPx-660

Press when playing a tape recorded with Dolby NR. Each press of the button switches in the sequence: Dolby B type NR ( B lights on display) → Dolby C type NR ( C lights on display) → Dolby NR OFF.

② Blank Skip Button

Press to skip blanks longer than 12 seconds between selections (BS lights on the display). This function is especially useful when advancing from the end of one side of a tape to the beginning of the other side.

③ Bass Control

④ Balance Control

⑤ Treble Control

⑥ Tape Slot

⑦ Display

⑧ Eject Button

Press this button to eject the cassette.

⑨ Volume Increase Button (+)

⑩ Volume Decrease Button (-)

Press the (+) side to increase the volume and the (-) side to decrease the volume. Each press of the button changes the volume to the next level (31 total). Holding the button down will successively increase/decrease volume.

⑦ Loudness Button

Press this button when listening to low volume sound and the inaudible low to high range will be augmented.

⑫ Program Switching/Release Button

Press to switch from SIDE A of a tape to SIDE B, or vice versa. Also used to cancel music search, music repeat (KPx-660), fast forward, and rewind operations.

⑬ Fast Forward Button (+)

⑭ Rewind Button (-)

Press the (+) side for fast forward and the (-) side for rewind. Pressing twice performs music search, while pressing a third time returns to normal playback.

⑮ Attenuator Button (KPx-660)

Press this button and volume level decreases instantaneously to 1/10 of the original volume. Press the button again and volume returns to the original level.

⑯ Music Repeat Button (KPx-660)

Press this button to hear the piece you are listening to as many times as you wish. To cancel music repeat, press the release button or music repeat button one time.

- All the press type control buttons have an electronic sound (beep) and display for dual confirmation of operation.
- Noise reduction manufactured under license from Dolby Laboratories Licensing Corporation. "Dolby" and the double-D symbol are trade marks of Dolby Laboratories Licensing Corporation.
- Connection of an optional system remote control unit (CD-R102) makes possible remote control of volume, fast forward, rewind, and music search.

3. READING THE DISPLAYS



KPX-660



KPX-440

Fig. 4

Fig. 5

① Blank Skip Display

Lights when the blank skip button is pressed.

② Music Search Display

MS flashes on the display during music search and blank skip operations.

③ Loudness Display

Lights on the display when the loudness button is pressed.

④ 70 µs Tape Display

An automatic tape selector will switch the equalization (70 µs/120 µs) when a cassette tape is loaded into the unit. A 70 µs tape will cause 70 µs to be displayed, while a 120 µs tape will result in no display at all.

⑤ Dolby NR Display

KPX-440

D will light when the Dolby NR button is pressed.

KPX-660

D B lights on the display when the Dolby NR button is pressed. Pressing again causes D C to light.

KPX-440

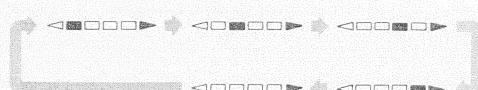
⑥ Tape Transport Indicators

► indicates normal tape transport, while ◀ indicates reverse tape transport. These indicators flash during fast forward/rewind operations.

KPX-660

⑦-1: Tape Transport Indicator (Normal Direction)

Normal tape transport is indicated by ► and the transport display illustrated below:



⑦-2: Tape Transport Indicator (Reverse Direction)

Reverse tape transport is indicated by ◀ and the transport display illustrated below:



⑦-3: Fast Forward/Rewind Display

The movement speed of the LED (■) increase during fast forward/rewind operations.

⑦-4: ATSC (Automatic Tape Slack Canceller) Display

When a cassette is set in the deck, the tape slack is taken up automatically. At this time ■■■■■ display flashes.

- The KPX-440 also features a built-in tape slack canceller, but there is no indication on the display during its operation.

⑧ Volume Level Display (KPX-440)

Volume Level/Attenuator Display (KPX-660)

Displays the volume level. The bottom indicator (■) is always lit, even at the lowest volume setting.

KPX-660

The volume level display blinks when the attenuator button is pressed. The volume level while the display is blinking is 1/10 that of the original volume.

⑨ Music Repeat Display (KPX-660)

Lights when the music repeat button is pressed. The music repeat function is in operation while this indicator is lit.

4. PLAYBACK

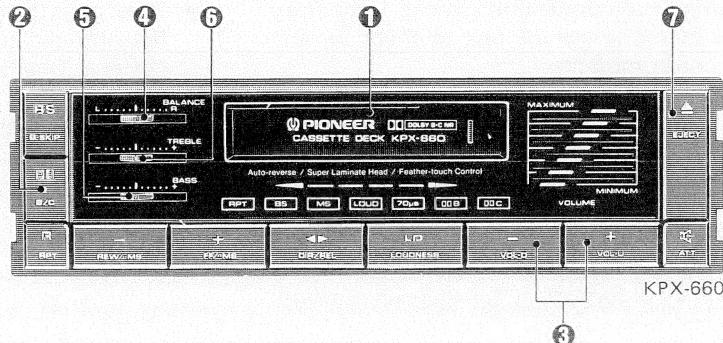


Fig. 6

1. Insert a cassette tape into the tape slot ①. The deck will automatically set the tape and begin playback.

KPx-440

2. Press Dolby NR button ② to listen to your tapes recorded on Dolby NR system.

KPx-660

2. Press the Dolby NR button ② to select Dolby B type NR or Dolby C type NR to match the recording method of the tape being played.
3. Adjust volume ③, balance ④, bass ⑤, and treble ⑥ controls as you like.

4. To stop a tape that is playing, press the eject button ⑦.

- The cassette tape will automatically be ejected after a few seconds if it fails to be set. Reinsert the tape and try to set it again.
- A loose or warped label on a cassette tape may interfere with the eject mechanism of the unit or cause the cassette to become jammed in the unit. Avoid using such tapes or remove such labels from the cassette before attempting use.

5. CONVENIENT TAPE OPERATION

Music Search

Music search is convenient for replaying the selection you are listening to or advancing instantly to the beginning of next selection.

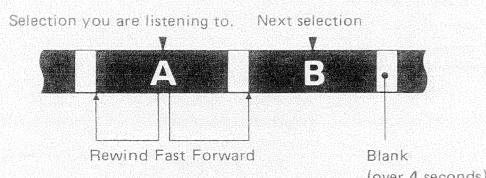


Fig. 7

Playing Selection A Again from the Beginning

Press the rewind button (–) twice. (MS flashes on the display.) The unit will automatically locate the beginning of selection A and normal playback will begin.

- Press the fast forward button (+) twice in succession for music search in the forward direction. (MS flashes on the display.)

Music Repeat (KPx-660)

Music repeat lets you repeatedly listen to a selection as many times as you wish.

Listening to Selection A Many Times

While listening to selection A, press the music repeat button (RPT illuminates on the display) and selection A will be replayed until the repeat function is released.

- Press the release button or the music repeat button to cancel music repeat.

Note:

The following can cause music search and music repeat (KPx-660) to operate incorrectly. This improper operation does not indicate malfunction of the unit.

- Unrecorded "blank" portions between selections are less than 4 seconds → the blank portion cannot be detected by the unit.
- Pauses in recorded conversations are longer than 4 seconds → the unit reads these as blanks between selections.
- Portions are recorded at very low volume for more than 4 seconds → the unit reads these as blanks between selections.

6. CONNECTING THE UNITS

- Before making final connections, make temporary connections then operate the unit to check for any connecting cord problems.
- Refer to the respective manuals of the main amp and other units for details on proper connections.
- A separately available source extension switching unit (CD-404) is required when used in combination with a CD player and tuner (GEX-007).
- Be sure to correctly connect the memory power supply lead (orange) as specified. If the connection is made incorrectly or forgotten, this unit will not work at all.

- Don't pass the memory power supply lead through a hole into the engine compartment to connect to the battery. This can damage the lead insulation and cause a short.
- If you should encounter more than two lead wires of the same color, when wiring connections, wire them together as shown in the following diagram. (Fig. 8)

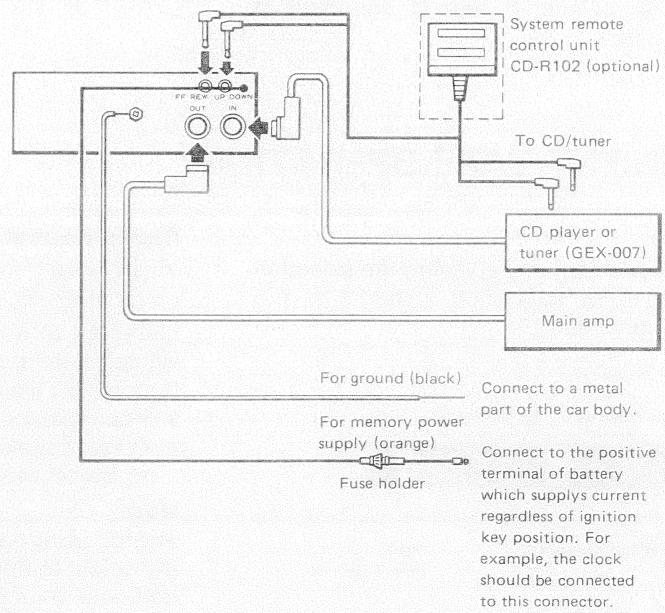
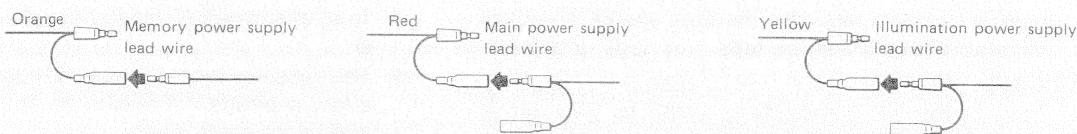


Fig. 8

7. DISASSEMBLY

● Removal of Case

1. Remove the 5 mounting screws, then lift up the case.

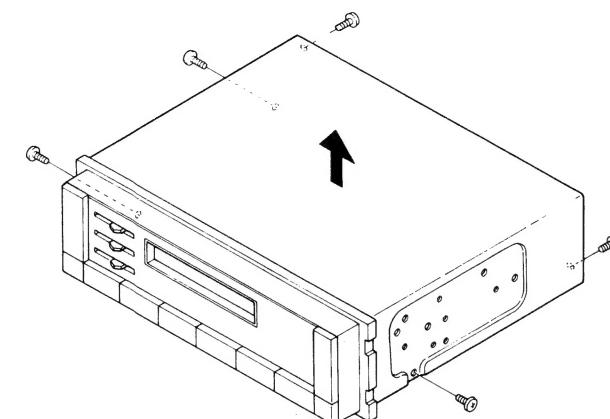


Fig. 9

● Removal of Cassette Mechanism Assembly (Fig. 10)

1. Remove the 4 mounting screws labeled (A) and connector, then remove the cassette mechanism assembly.

● Removal of Audio Unit (Fig. 10)

1. Remove the mounting screw labeled (B).
2. Bend the two tabs, then remove the audio unit in the direction indicated by the arrow.

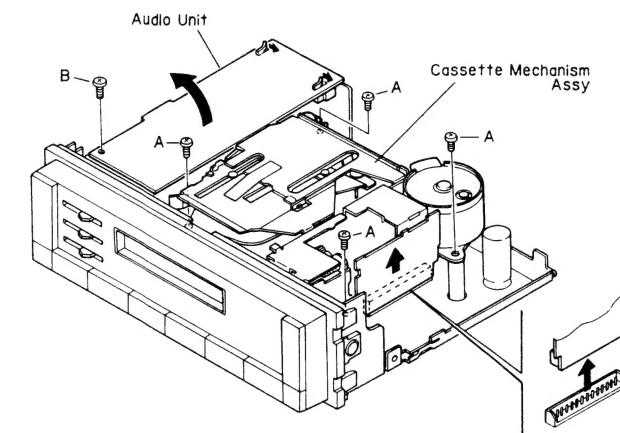


Fig. 10

● Removal of Grille Unit

1. Remove the two mounting screws, then remove the grille unit.
2. Pull the connector in the direction indicated by the arrows and disconnect the flexible PCB.

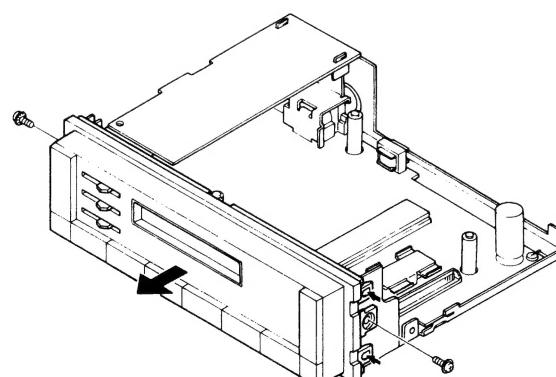


Fig. 11

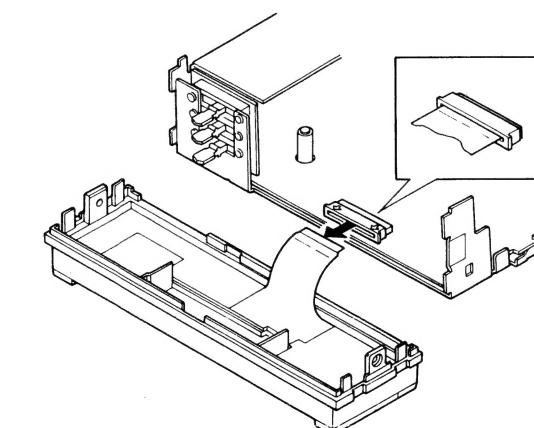


Fig. 12

● Removal of Display Unit

1. Remove the 7 mounting screws, then remove the display unit.

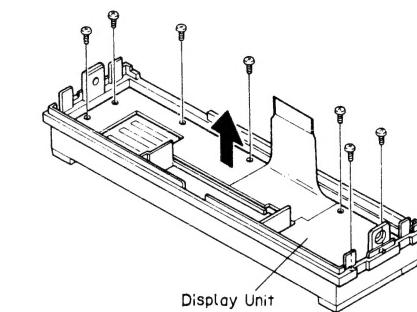


Fig. 13

● Removal of Bass/Treble Unit (Fig. 14)

1. Remove the 6 mounting screws labeled (C), then remove the bass/treble unit.

● Removal of Chassis Unit (Fig. 14)

1. Remove the mounting screw labeled (D).
2. Bend the two tabs, then remove the chassis unit.

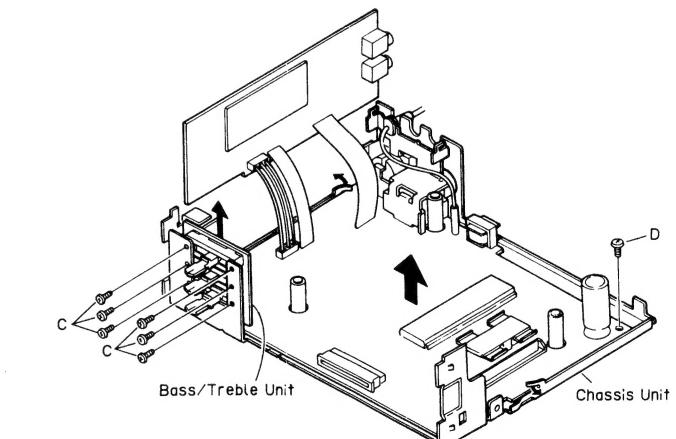
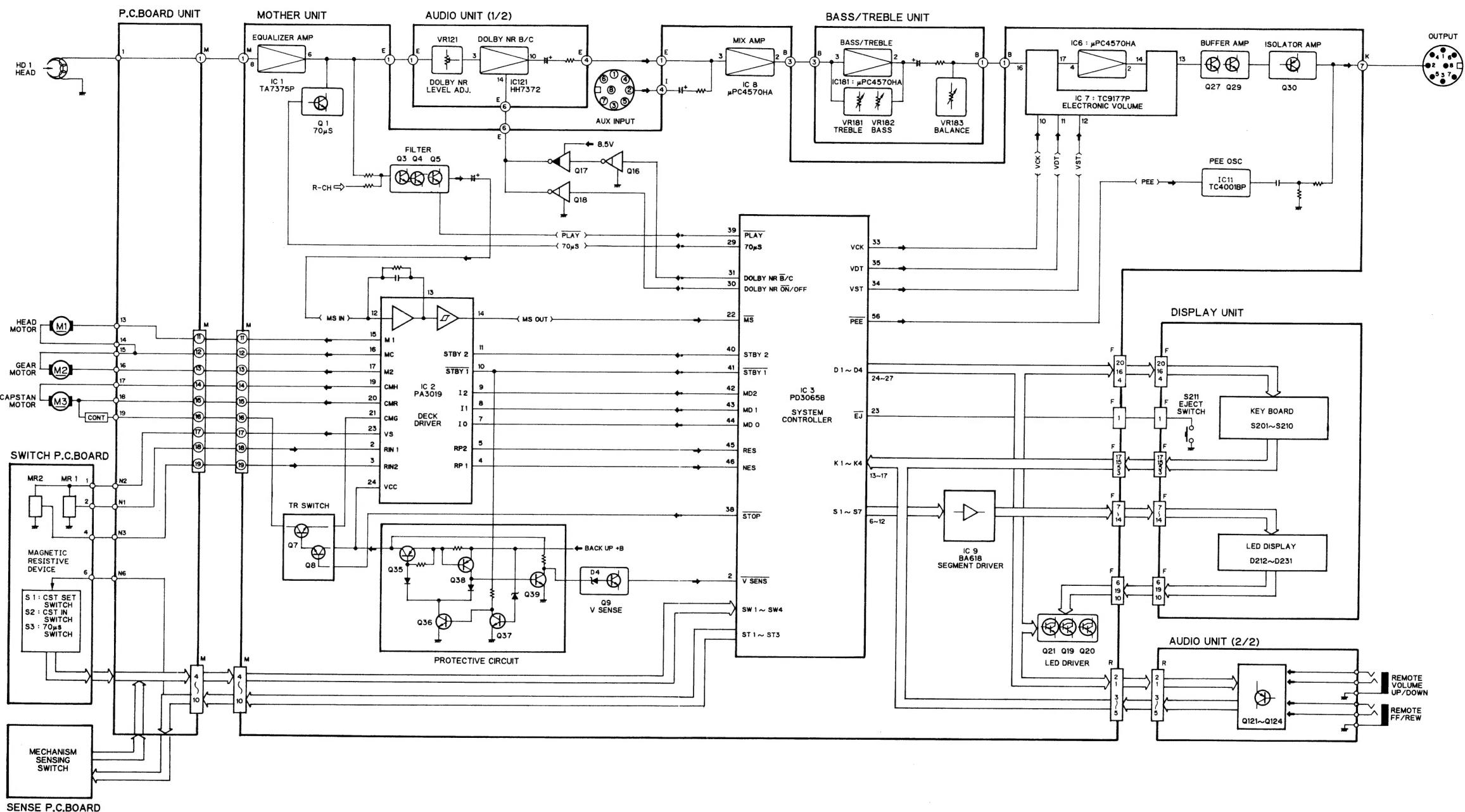


Fig. 14

8. CIRCUIT DESCRIPTION

- Block Diagram (KPx-660)



● Block Diagram (KPx-440)

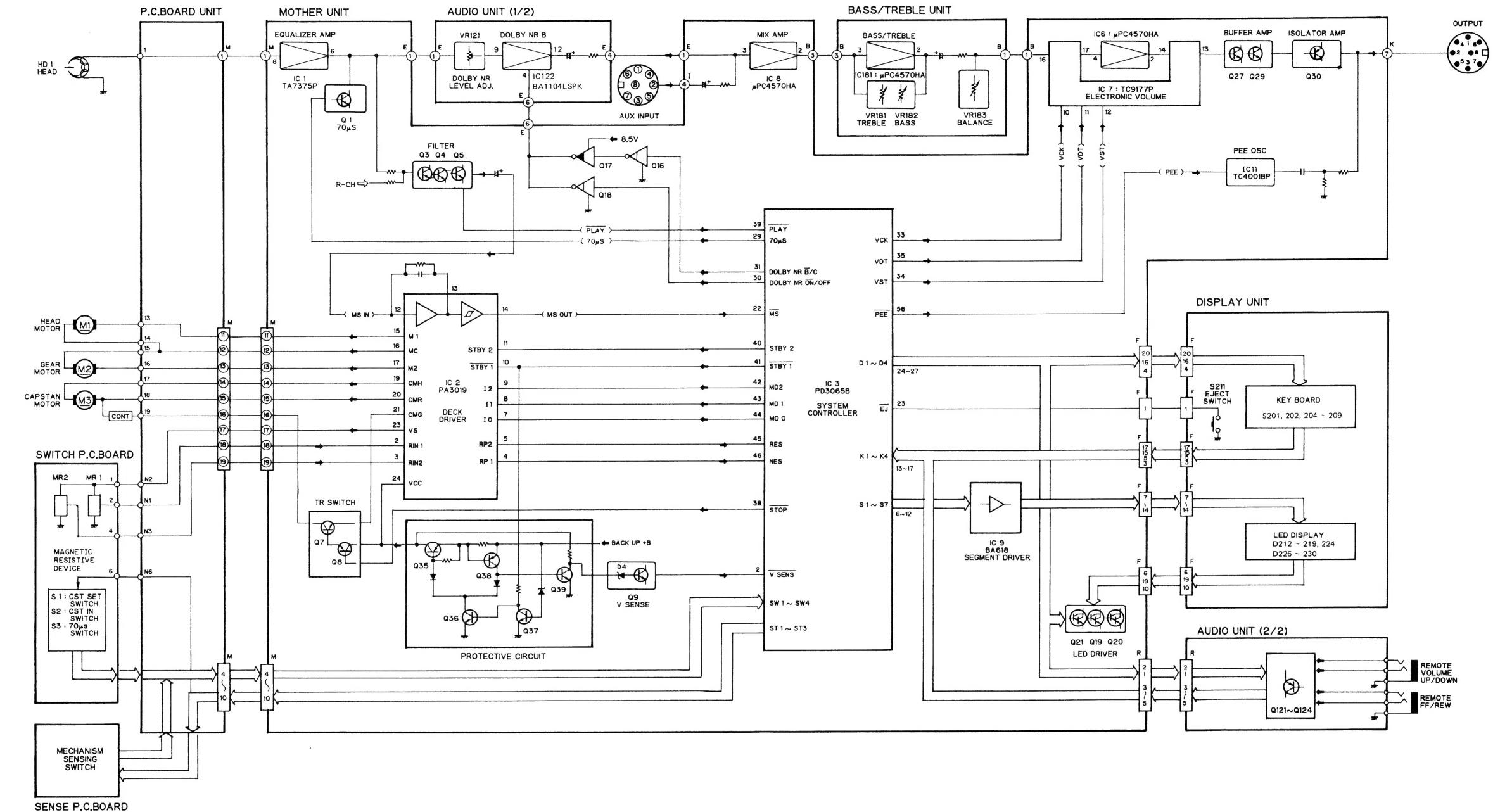
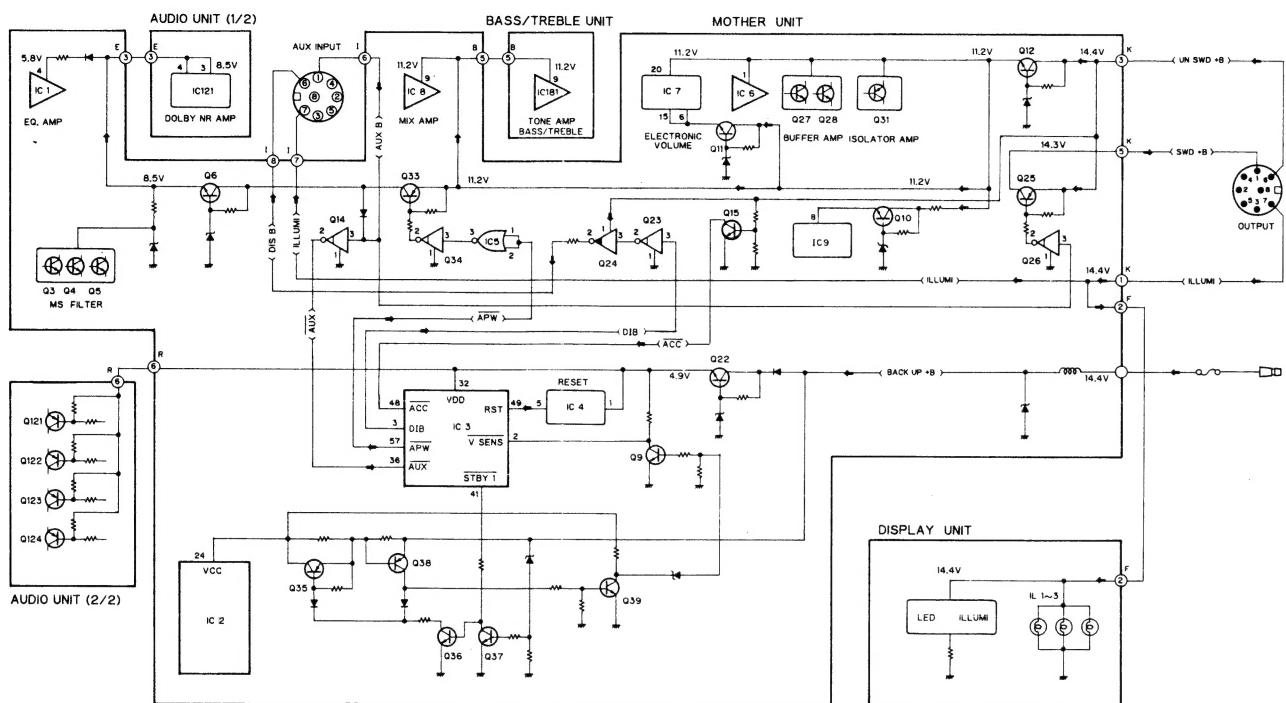


Fig. 16

● +B Block Diagram (KPx-660)



● Level Diagram (KPx-660)

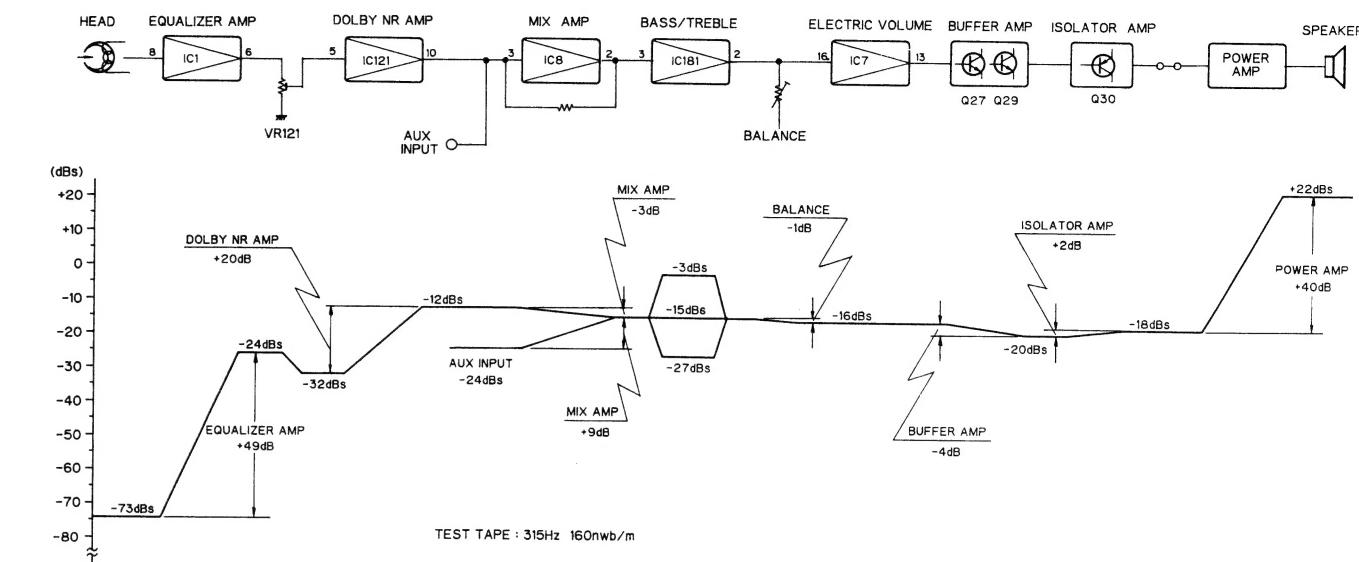
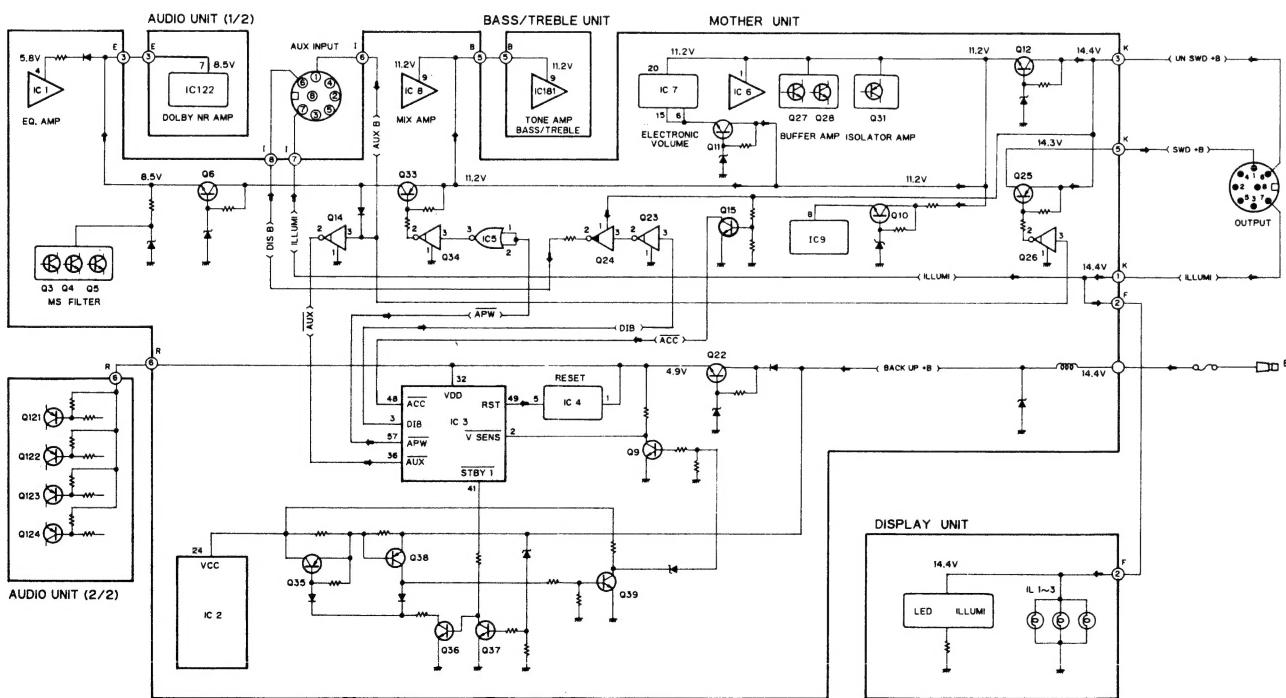


Fig. 19

Fig. 17

● +B Block Diagram (KPx-440)



● Level Diagram (KPx-440)

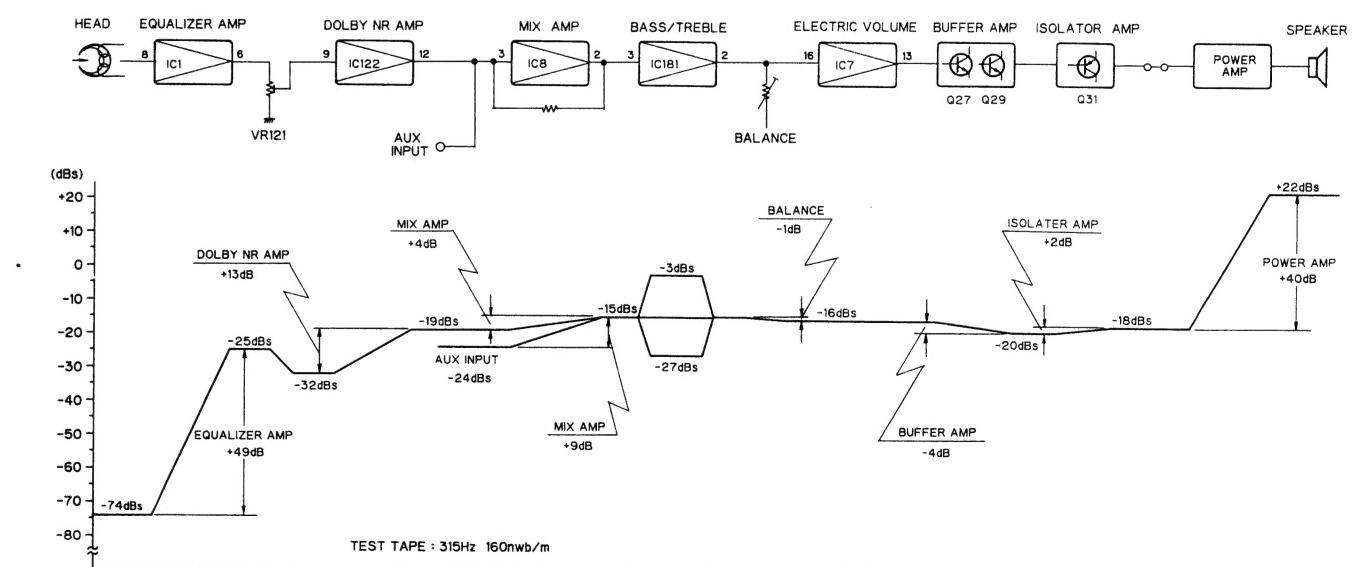


Fig. 20

Fig. 18

● Reel Unit Rotation Pulse Detection Circuit

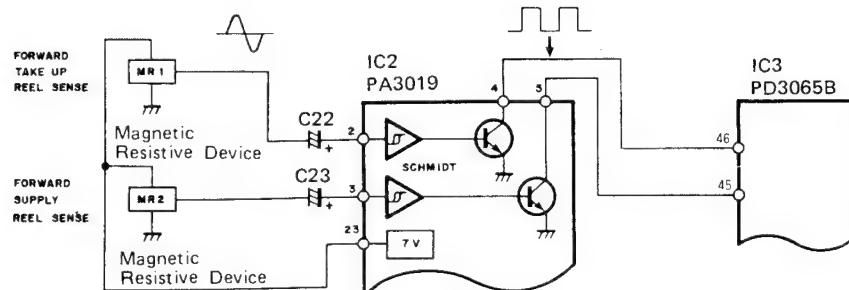


Fig. 21

- A continuous-wave is transmitted by the magnetic resistive device (MR 1, MR 2) as the reel unit rotates. This signal is formed into a wave pattern in the Schmitt circuit within IC2, and a square wave is output from pins 4 and 5 (IC2) in synchronization with the rotation of the reel unit. When rotation stops, potential is fixed at 0 or 5 volts.
- 1. Tape end detector:** When in the forward play mode, the forward take-up reel is monitored. When in the reverse play mode, the forward supply reel (reverse take-up reel) is monitored. When no pulse is detected for more than 1.2 seconds, the circuit senses that the tape has ended and changes the tape direction.
- 2. ATSC:** While rewinding, when rotation of the reel unit on the side from which the tape is being supplied (the take-up side when in the forward play mode) is detected (8 pulses within 600 ms), the deck switches to the play mode.

- 3. MS overrun compensator:** When a blank spot on the tape is detected when RMS (rewind music search) is engaged, a stop message is sent to the mechanism, but overrun occurs due to inertia in the cassette and in the reel unit. The length of this overrun (number of revolutions) is monitored, and after switching to the play mode, volume is muted until that length of tape is played. When FMS (fast forward music search) is engaged, the start of the next piece is detected. The deck then switches automatically to RMS, and the actions described above take place.

● Reset Circuit

Make the initial set-up by applying H to the RST (reset) terminal of IC3 when connecting the BACK UP +B or after BACK UP +B fell abnormally and returned to the normal voltage.

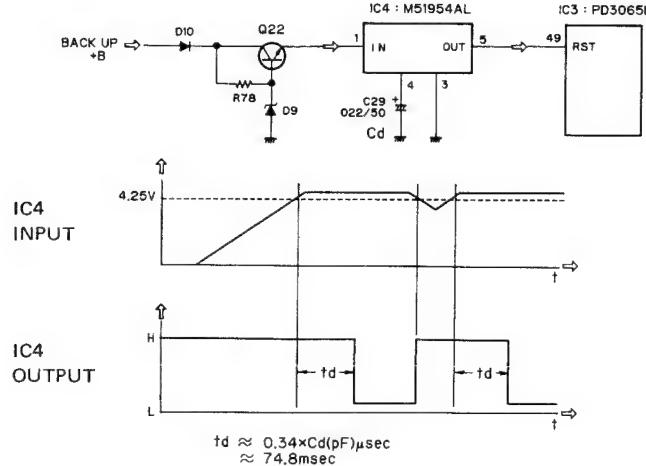
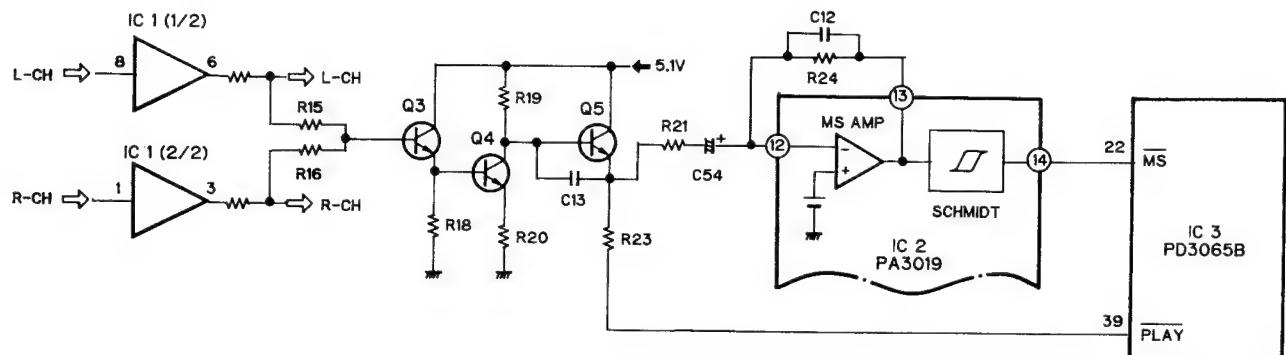


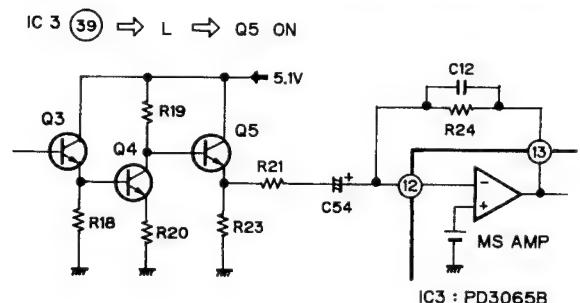
Fig. 22

● MS Circuit

Fig. 23

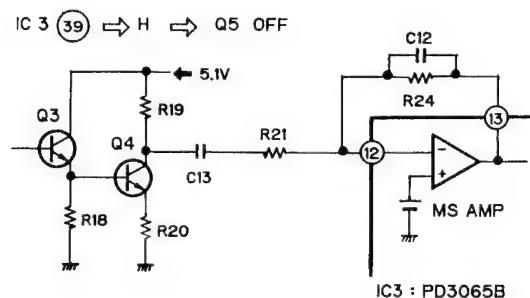
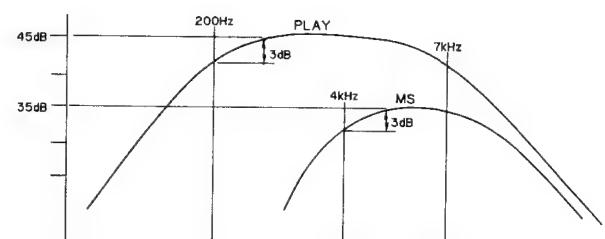
The MS circuit detects blank spots on the tape. It consists of a filter, a differential MS amplifier (inside IC2), and a Schmitt comparator (inside IC2). The non-inverted input pin on the MS amplifier is fixed at a standard voltage inside the IC, and the inverted input pin is connected with the outside. The left and right output signals from the Dolby NR circuit are combined and transmitted to pin 12 of IC2 after passing through the filter circuit. Pulses are generated at the output pin of the Schmitt comparator when recorded music exceeds a minimum amplitude. Music selection is then carried out by IC3, which senses these pulses. The filter circuit switches between frequency response and gain when changing from the "Play" music selection mode to the "high speed" music selection mode.

1. "Play" Music Selection (Equivalent circuit diagram 24):

IC3 pin 39 goes "low", and Q5 go to the "on" position. Since Q5 is acting as an emitter follower at this time, its output impedance is sufficiently low compared with R21. The gain from either the left channel or the right channel to IC2 pin 13 is approximately 45 dB. The low range cut off frequency is approximately 200 Hz and the high range cut off frequency is approximately 7 kHz.


Fig. 24
2. "FF" "REW" Music Selection (Equivalent circuit diagram 25):

IC3 pin 39 goes "high", and Q5 go to "off." At this time, the gain is approximately 35 dB, the low range cut off frequency is approximately 4 kHz and the high range cut off is approximately 7 kHz.


Fig. 25

Fig. 26 Filter Characteristics

● Electronic volume

○ Function of terminals (TC9177P)

Terminal	Name	I/O	Function and operation
2, 3 19, 18	L-Loudness 1, 2 R-Loudness 1, 2	Output	Loudness terminal When loudness data is input, this terminal will be -20 dB tap terminal. Loudness is controlled by the high-low boost circuit connected to this terminal.
4 17	L-OUT1 R-OUT1	Output	10dB step attenuator output Signal with IN is attenuated from 0 to 70 dB in 8 steps at the 10 dB step.
5 16	L-IN1 R-IN1	Input	10 dB attenuator input
6, 15	A-GND		AC ground terminal
7 14	L-IN2 R-IN2	Input	2 dB attenuator input
8 13	L-OUT2 R-OUT2	Output	2 dB attenuator output Signal with IN is attenuated from 0 to 8 dB in 5 steps at the 2 dB step.
11	DATA	Input	Data input of attenuation amount and channel selection Consisting of 20 bits, it is input by the CK signal.
10	CK	Input	Clock input Clock input to fetch data of the DATA terminal.
12	ST	Input	Strobe input Attenuation amount and channel selection data fetched from the DATA and CK terminal can be latched by having this terminal set to "H" level. If "H" level is not applied to this terminal, the previous data will be in effect.
20	VDD		(+) power applied terminal
9	GND		Ground terminal
1	VSS		(-) power applied terminal

See page 31 for TC9177P block diagram.

The TC9177P is a built-in electronic volume IC for loudness ON/OFF. The attenuation volume data output by the system controller (IC3), is input to the DATA, CK, and ST terminals. The data consists of 20 bits. It consists of the following.

Bit	Description
1, 2	Selection of L channel, R channel
3	Bit for loudness ON/OFF. "1" is ON, and "0" is OFF.
4 – 8	Setting of 2 dB step attenuator
9 – 16	Setting of 10 dB step attenuator
17 – 20	Chip select bit "0001" is select mode, for values other than this, there is no operation.

There will be infinite attenuation volume for -78 dB data. Therefore, step up from infinity to 1 will be -76 dB. Changes of the fetched data will all be synchronized with ST signal transition.

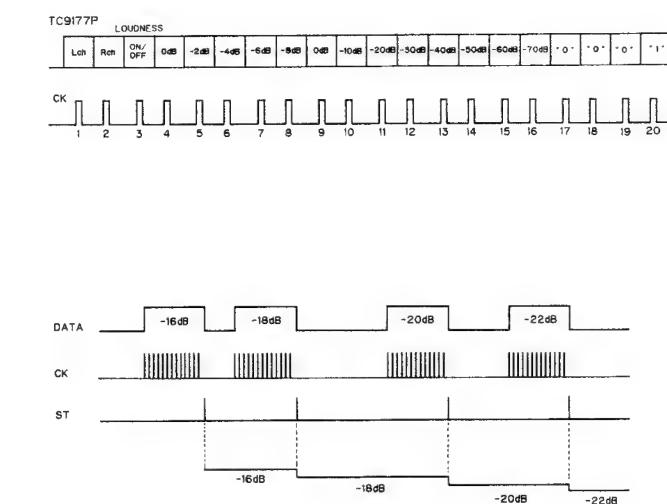


Fig. 27

The attenuator section consists of a diffused resistor array and an analog switch. Attenuator 1 can attenuate 0 to 70 dB at 10 dB step, and attenuator 2 can attenuate 0 to 8 dB at 2 dB step, for a total attenuation of 0 to 76 dB at 2 dB step.

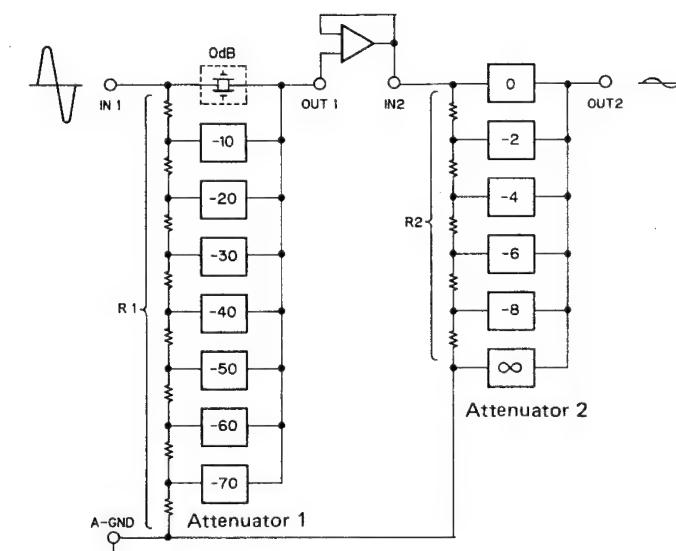


Fig. 28

○ Loudness function

The TC9177P has tap for loudness. When bit 3 of the data is made to "1," loudness switch LS1 will turn ON, LS2 will turn OFF, and the -20 dB tap is output to loudness-1 and loudness-2 terminals.

With the loudness-1 and loudness-2 terminals having a high-low band boost circuit, loudness can be controlled below -20 dB.

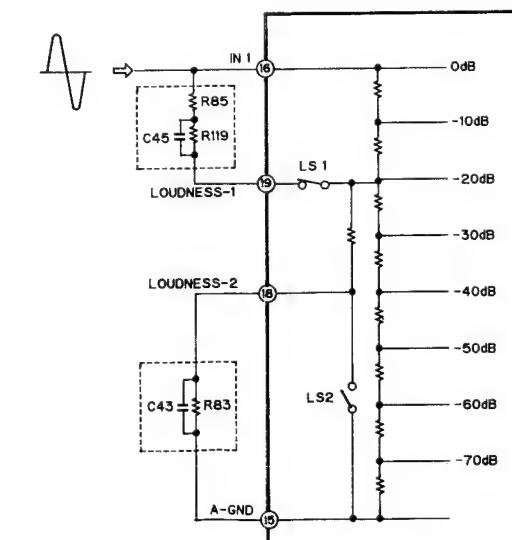


Fig. 29

When bit 3 of the data is made to "0," loudness switch LS1 will go OFF, and LS2 will go ON. Loudness will go OFF without high-low band boost circuit operation.

● Operation

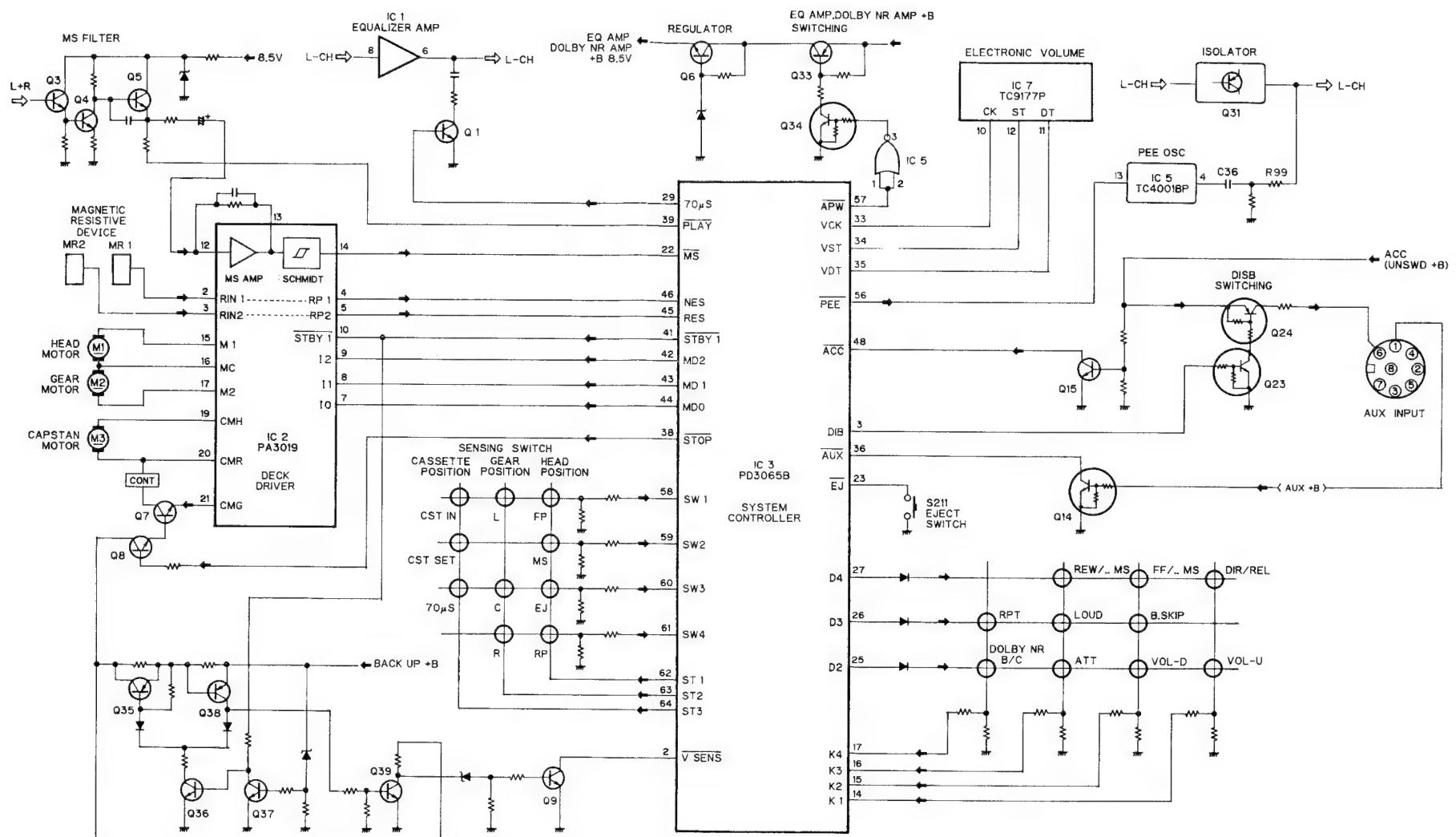


Fig. 30

○ Sensing switches

Cassette Position

Switch	Function
CST IN switch	Turned OFF when a cassette tape is inserted.
CST SET switch	Turned ON when the cassette tape is set in position.
70μs switch	Turned OFF when a 70μs cassette tape is inserted.

FF/REW Gear Position (Switch Position) Sense P.C. Board (B)

Position	Mechanism operation
L	FF in FWD (normal) and REW in REV
C	Eject or play
R	REW in FWD (normal) and FF in REV

Head Position (Switch Position) Sense P.C. Board (A)

Position	Mechanism operation
FP	FWD PLAY
MS	MS
EJ	Eject
RP	REV PLAY

● Control Mode and Operation of Mechanism

Control mode	Control code IC3 (PD3065B)			Mechanism operation	Output terminal voltage IC2 (PA3019)					
	MD 0 (44)	MD 1 (43)	MD 2 (42)		CMH (19)	CMR (20)	CMG (21)	M 1 (15)	MC (16)	M 2 (17)
M 3 (CM)	Output OFF	0	0	0	Z	Z	Z	Z	Z	Z
	Normal	1	0	0	HC	L	↑	↑	↑	↑
	Reverse	0	1	0	L	HC	↑	↑	↑	↑
	Constant speed	1	1	0	PLAY, FF, REW or MS	HO	Z	L	↑	↑
M 1	Normal	0	0	1	Head EJ → FP	↑	↑	↑	HC	L
	Reverse	1	0	1	Head EJ → RP	↑	↑	↑	L	HC
M 2	Normal	0	1	1	Gear direction: R → L	↑	↑	↑	Z	L
	Reverse	1	1	1	Gear direction: L → R	↑	↑	↑	↑	HC

Notes: 1) Numbers in parentheses indicate pin numbers of each IC.

2) Output terminal voltage

Z: High impedance

HC: Approximately 7V

HO: Vcc - 1.7V

L: 0V

● Location of Major Parts

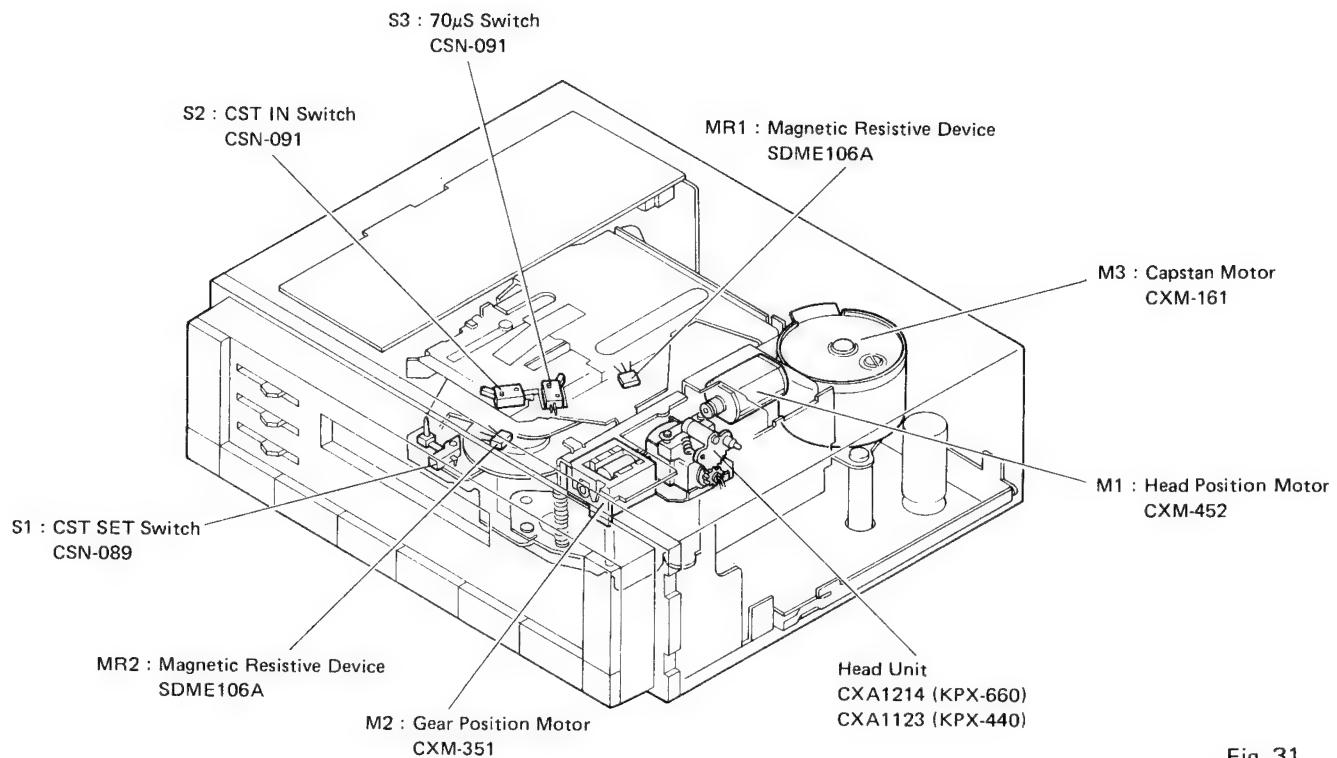
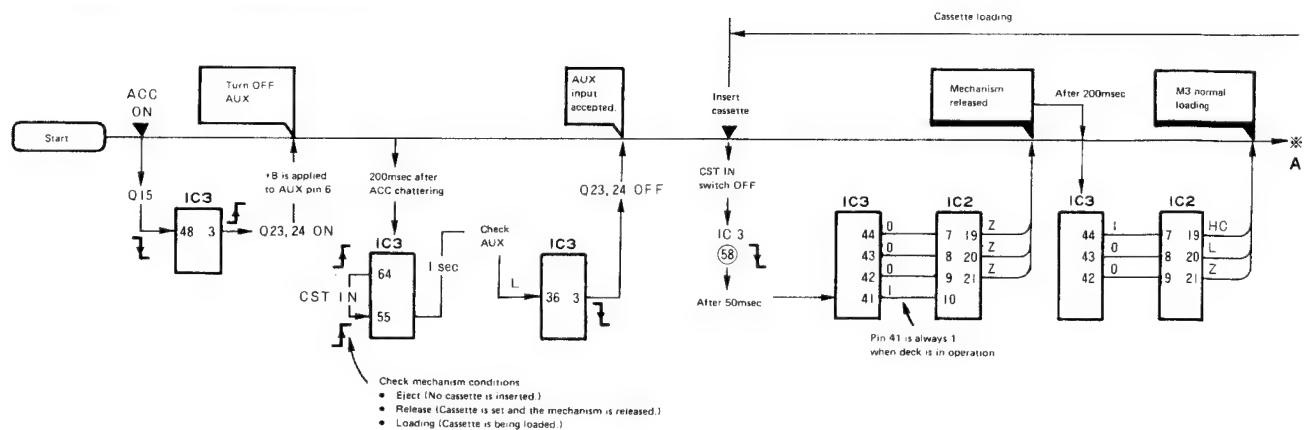
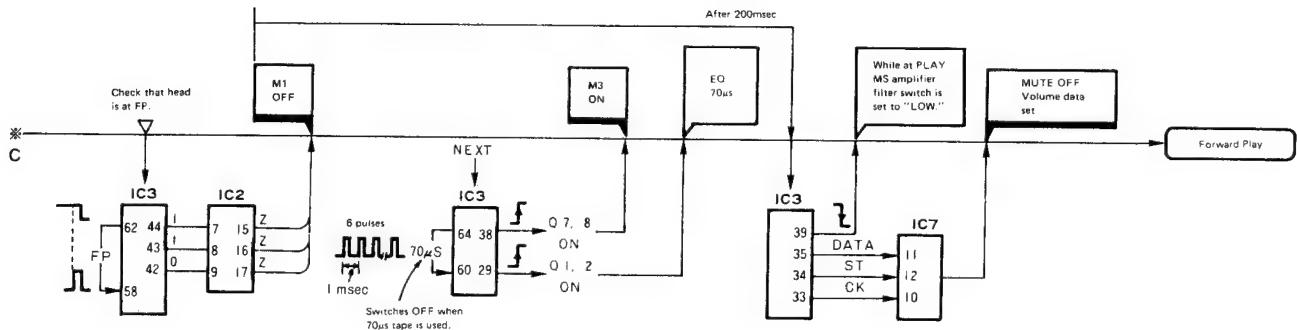
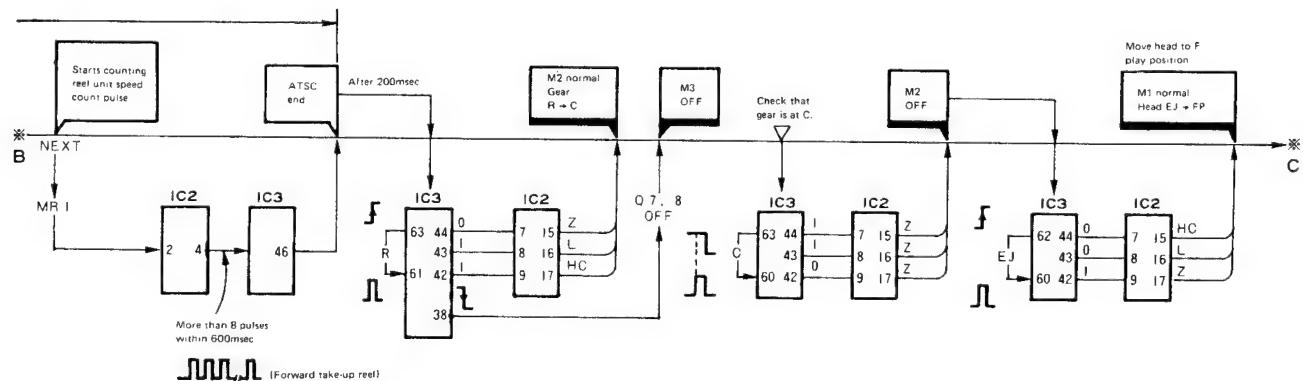
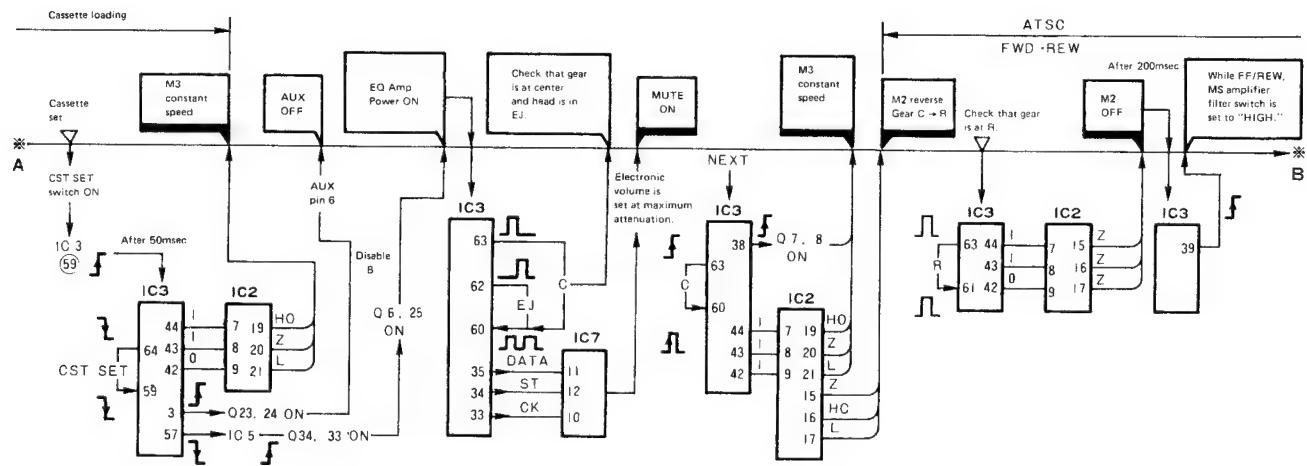


Fig. 31

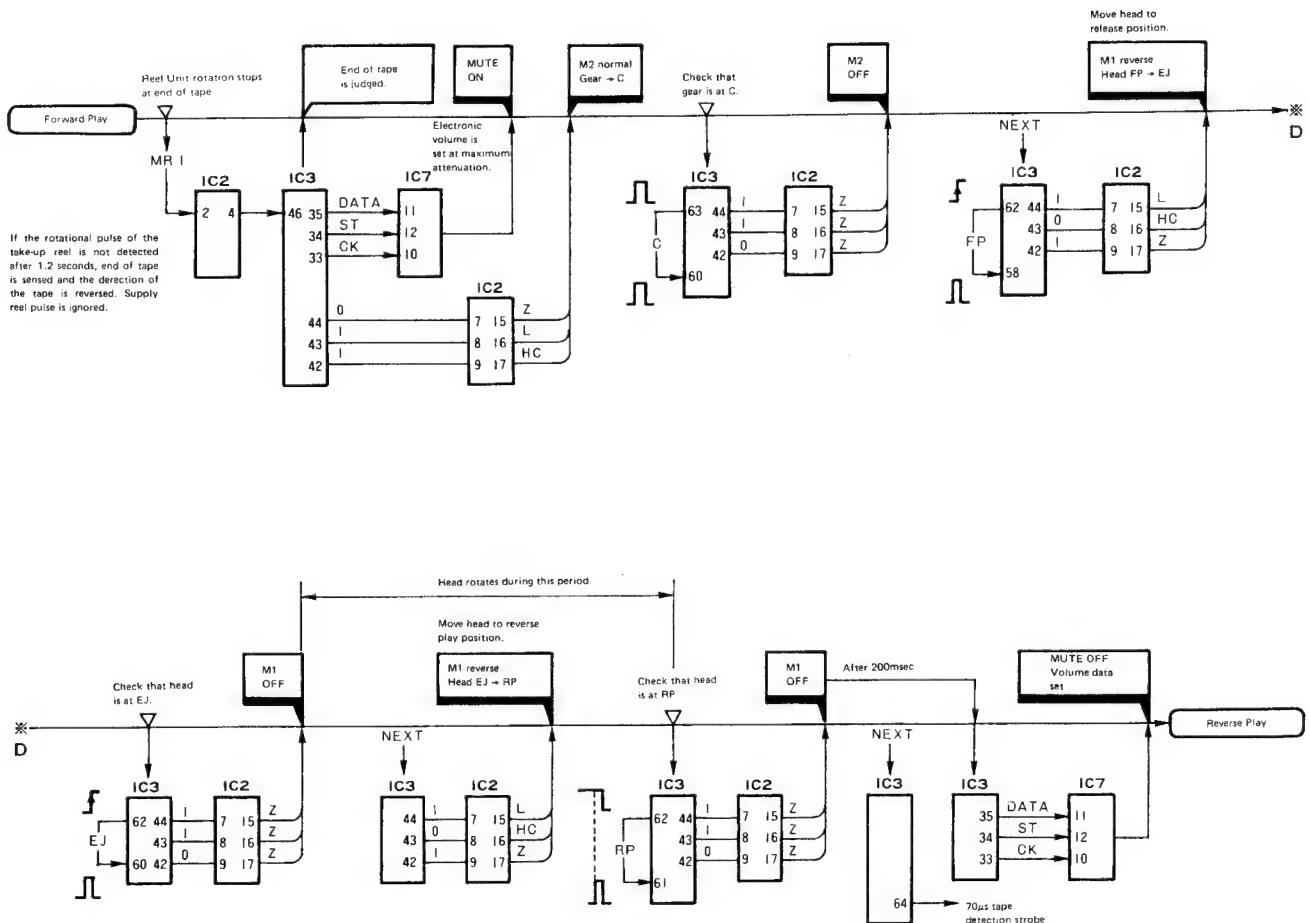
1. Cassette In – Forward Play



KPX-660



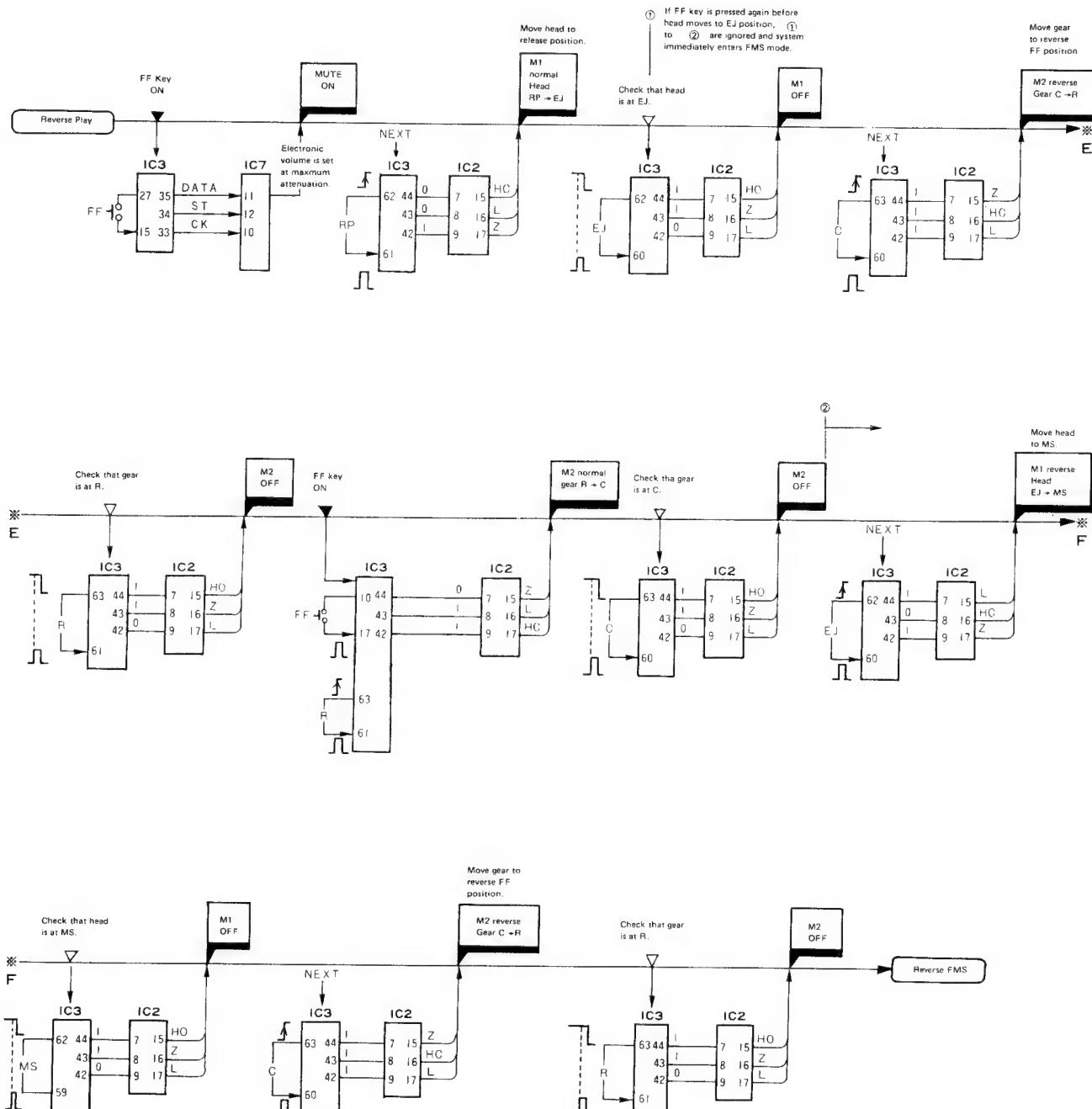
2. Forward Play → Reverse Play



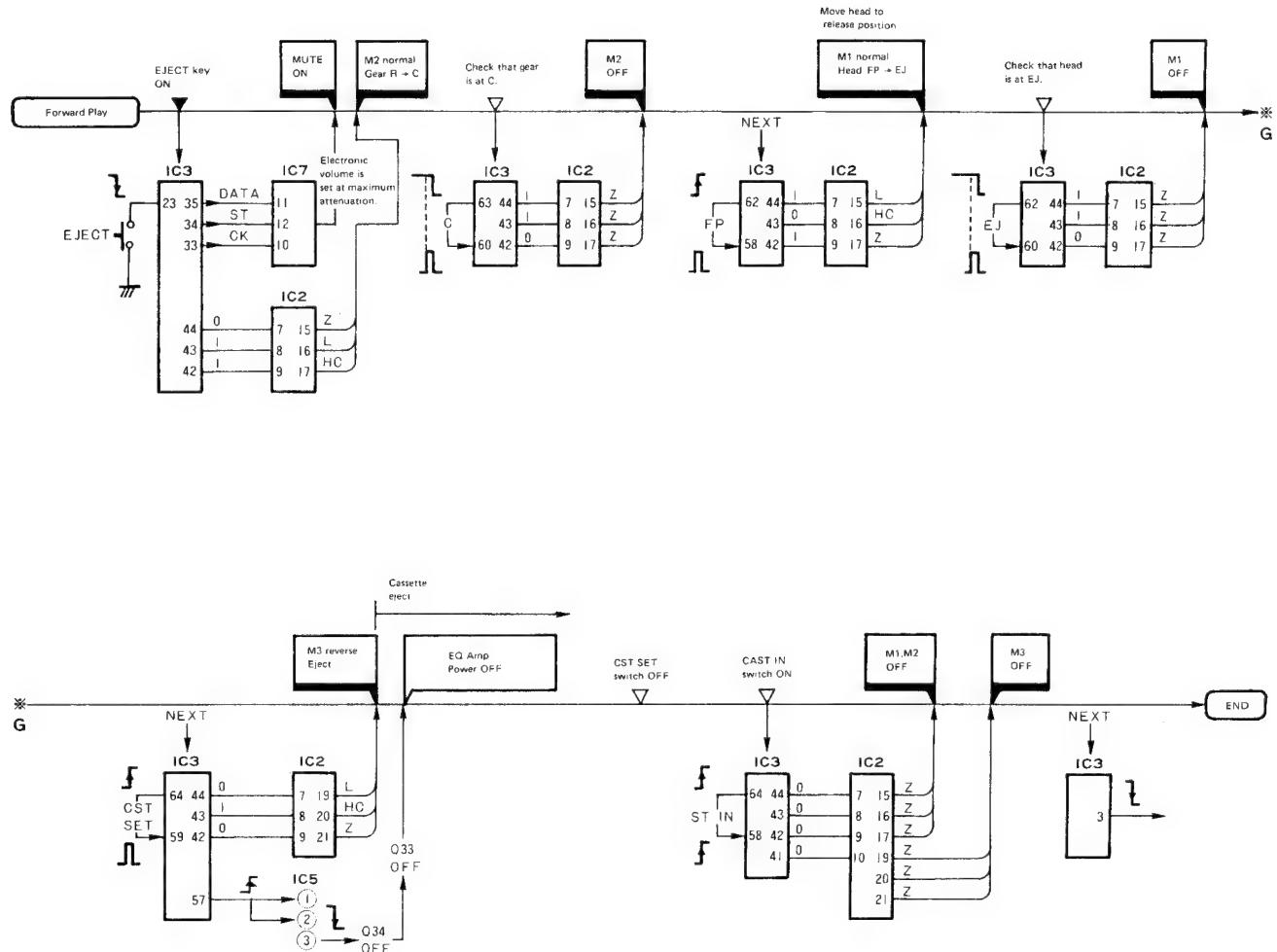
FF Key
ON

FF Key
ON

3. Reverse Play → Reverse FF → Reverse FMS

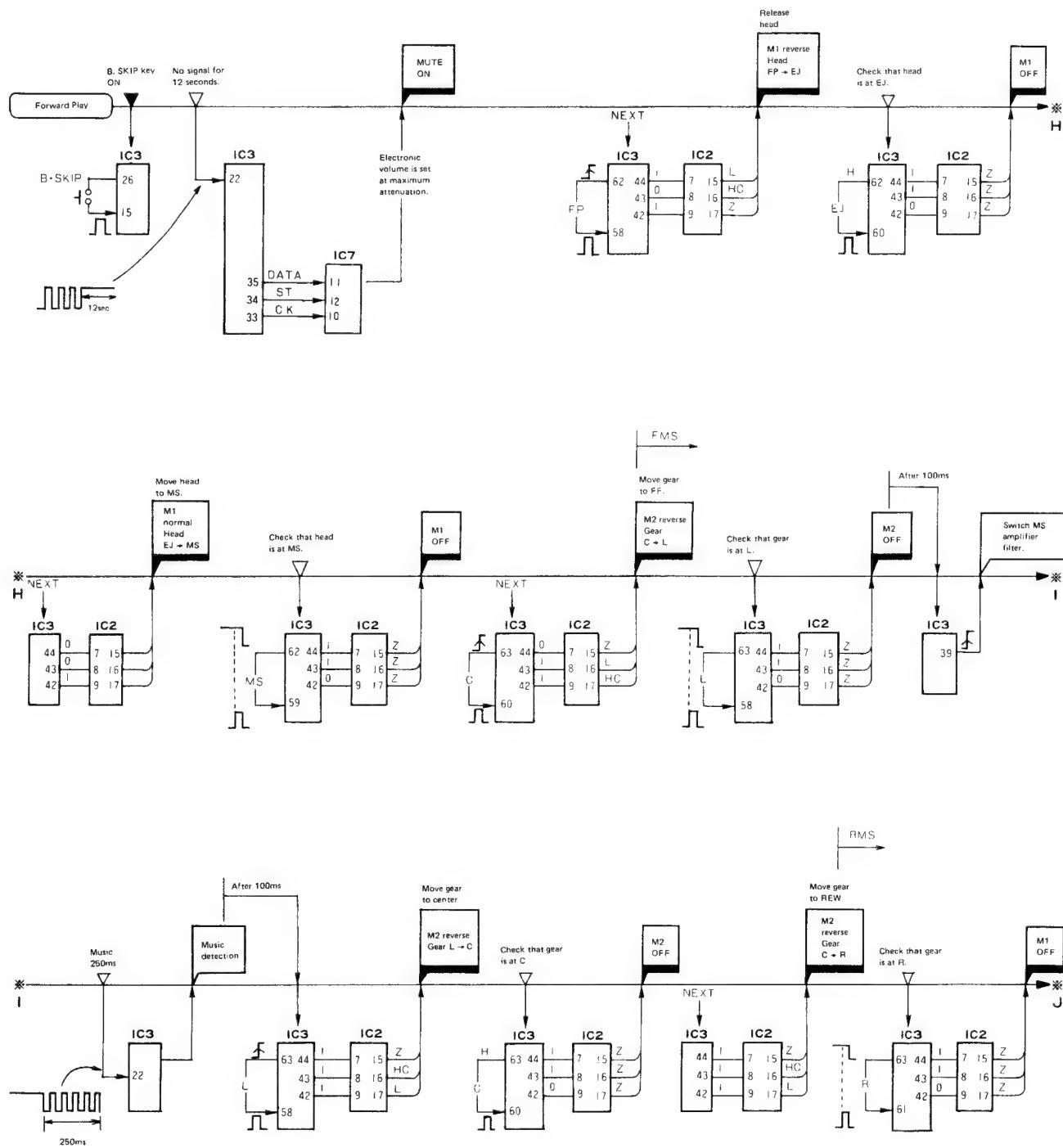


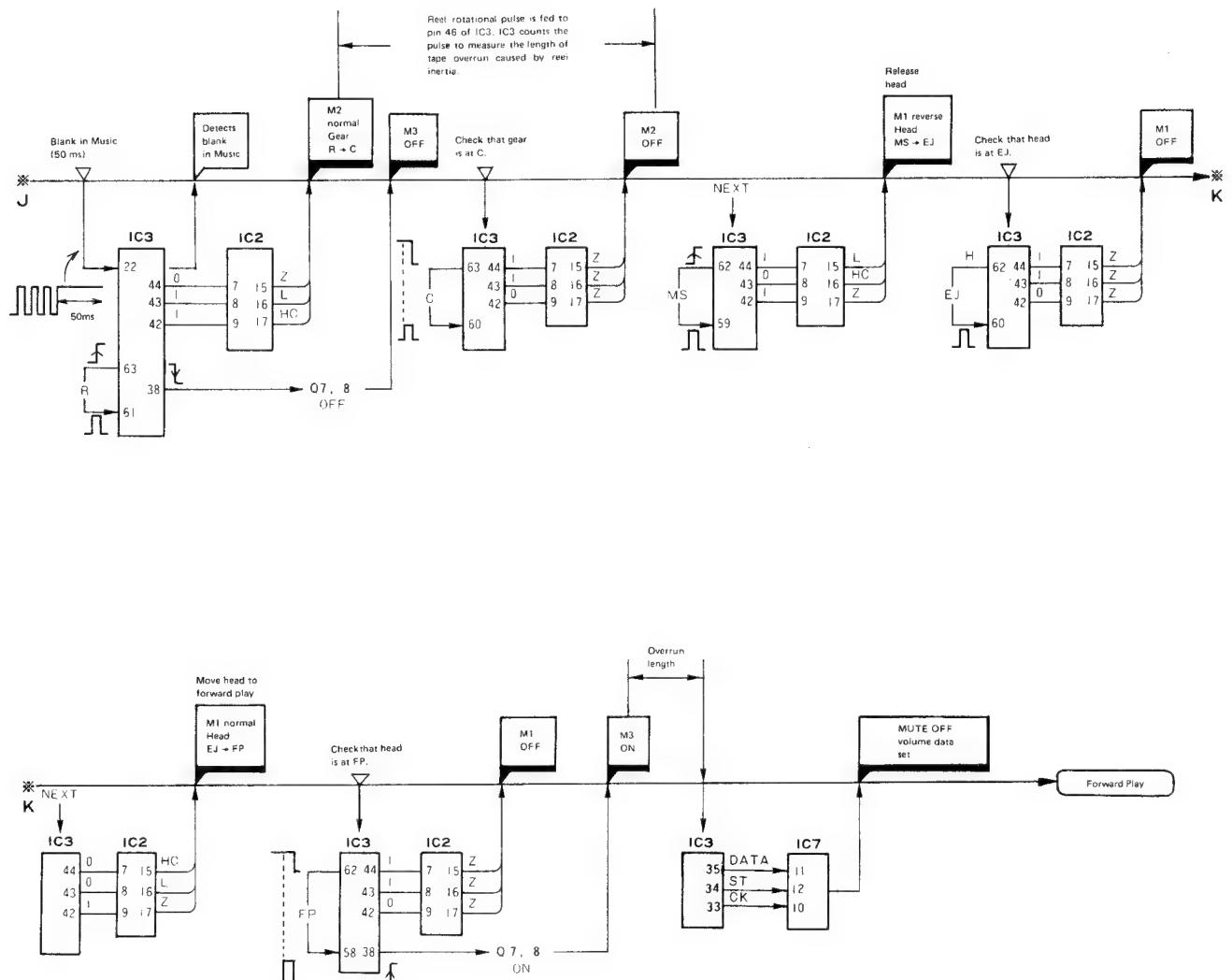
**Eject Key
ON**
↓
4. Forward Play → Eject





B. SKIP Key
ON ↓
5. Forward Play → **BS Forward Play** → **Forward 1 MS → Forward Play**

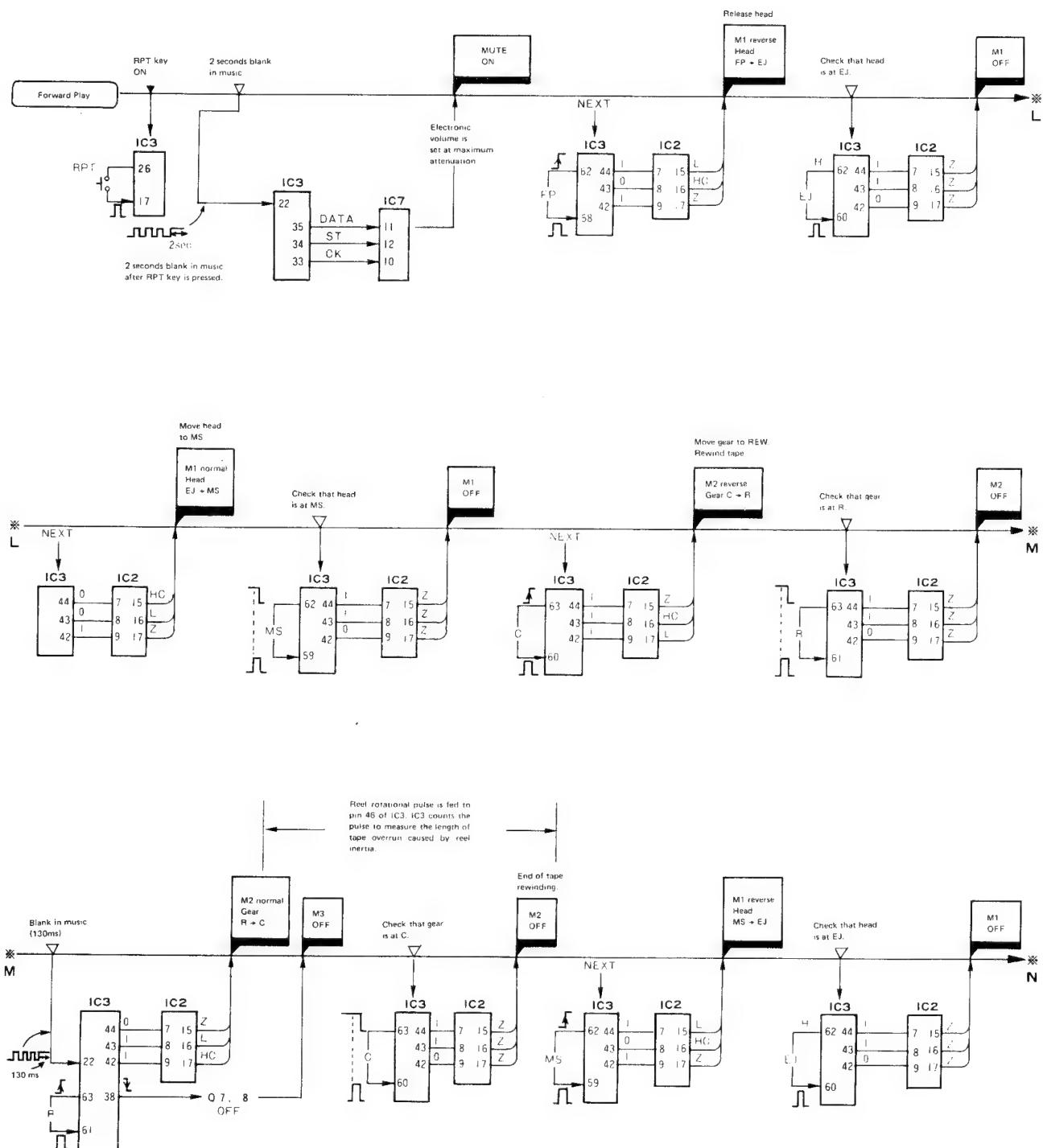


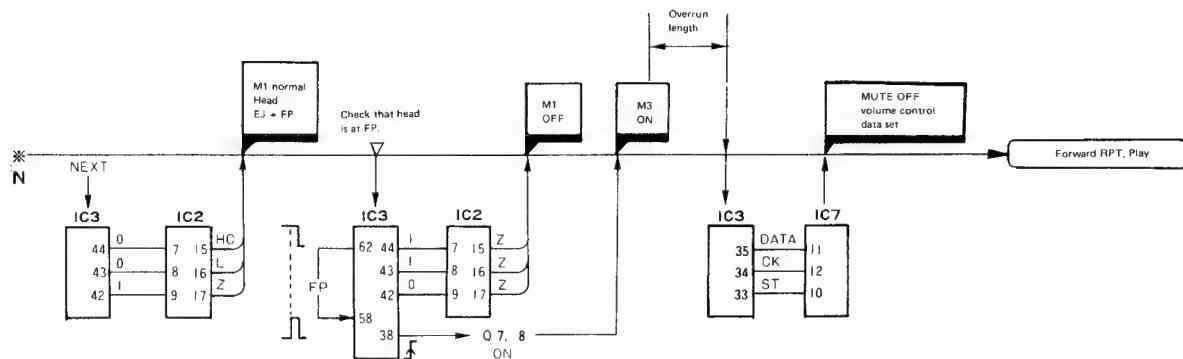


KPX-660

**RPT Key
ON**

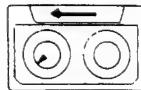
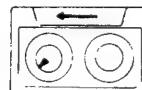
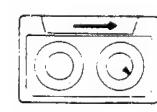
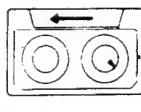
6. Forward Play → Forward RPT Play → Forward RPT REW → Forward RPT Play





9. ADJUSTMENT

9.1 CHECK POINTS OF CASSETTE MECHANISM

<p>Confirm the following items when replacing parts of the cassette mechanism.</p>	<p>■ Tape speed deviation: $3,000 \pm 90 \text{ Hz}$ $(4.76 \text{ cm/s} \pm 3\%)$</p> <p>Using an STD-301, measure the speed at the start and end of winding and see that a deviation remains within the limits each time. If values indicated by the pointer vary considerably, adjust to 70% of the minimum and maximum values. Measuring time shall be 5~6 seconds.</p>	<p>■ Wow and flutter: Less than 0.15% (WRMS)</p> <p>Using an STD-301, measure the wow and flutter at the start and end of winding and take the maximum value. If values indicated by the pointer vary considerably, adjust to 70% of the minimum and maximum values. Measuring time shall be 5~6 seconds.</p>
<p>■ Fast forward and rewinding time: $95 \sim 115 \text{ seconds}$</p> <p>Using a C-60, set to fast forward and rewind, and measure the time with a stopwatch.</p>	<p>■ Winding torque: $37 \sim 63 \text{ g} \cdot \text{cm}$</p>  <p>Using a cassette type torque meter (100 g·cm), measure the minimum value while in the play mode. Measuring time shall be 5~6 seconds.</p>	<p>■ F.F. torque: $62 \sim 130 \text{ g} \cdot \text{cm}$</p>  <p>Using a cassette type torque meter (120 g·cm), measure the value when the tape stops in the F.F. mode.</p>
<p>■ REW torque: $62 \sim 130 \text{ g} \cdot \text{cm}$</p>  <p>Using a cassette type torque meter (120 g·cm), measure the value when the tape stops in the REW mode.</p>	<p>■ Back tension torque: $2.0 \sim 3.5 \text{ g} \cdot \text{cm}$</p>  <p>After setting in the REW mode without loading a cassette tape for 5 minutes, measure the back tension torque in the play mode, using a cassette type torque meter.</p>	<p>■ Cassette loading force: $450 \sim 550 \text{ g}$</p> <p>Push the center of the cassette and measure the force with a tension meter (1kg).</p>

9.2 AZIMUTH ADJUSTMENT

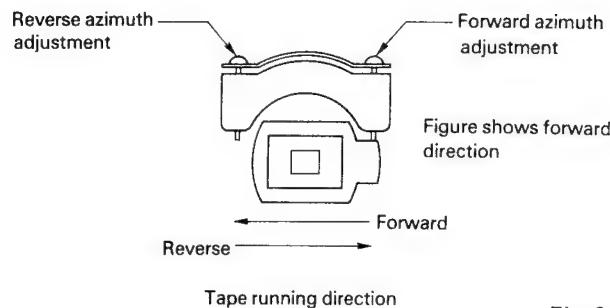


Fig. 32

9.3 TAPE SPEED ADJUSTMENT

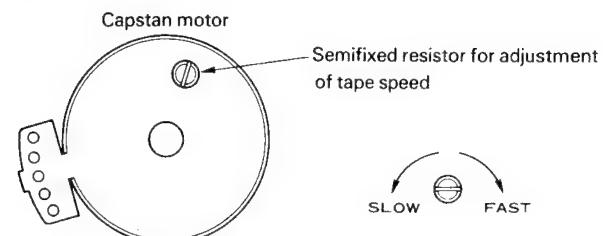


Fig. 33

• To Adjust

1. Play "A" side of STD-341A (10kHz, -20dB). Adjust each screw for maximum output in forward and reverse directions.
2. Play "B" side in forward and reverse directions to confirm adjustment.

9.4 DOLBY NR LEVEL ADJUSTMENT (KPx-660)

• Connection Diagram

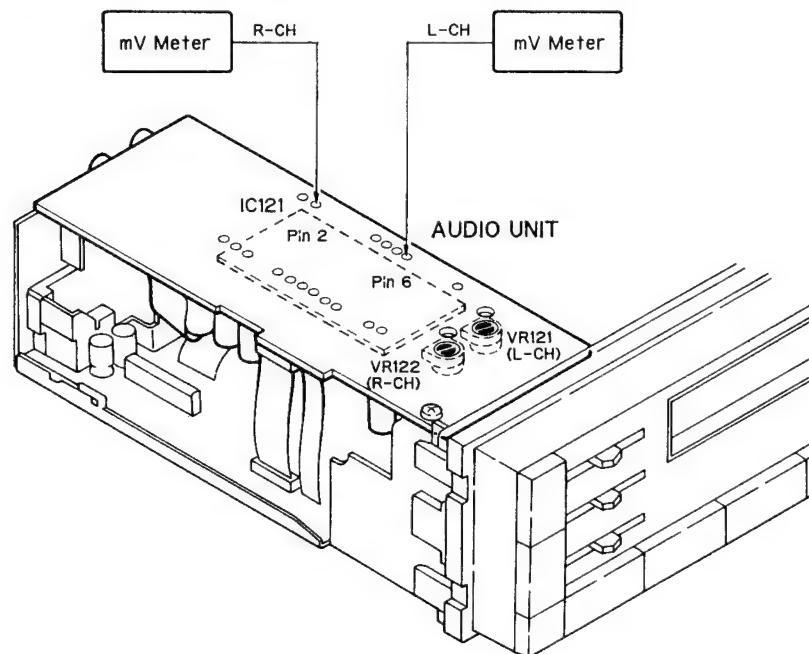


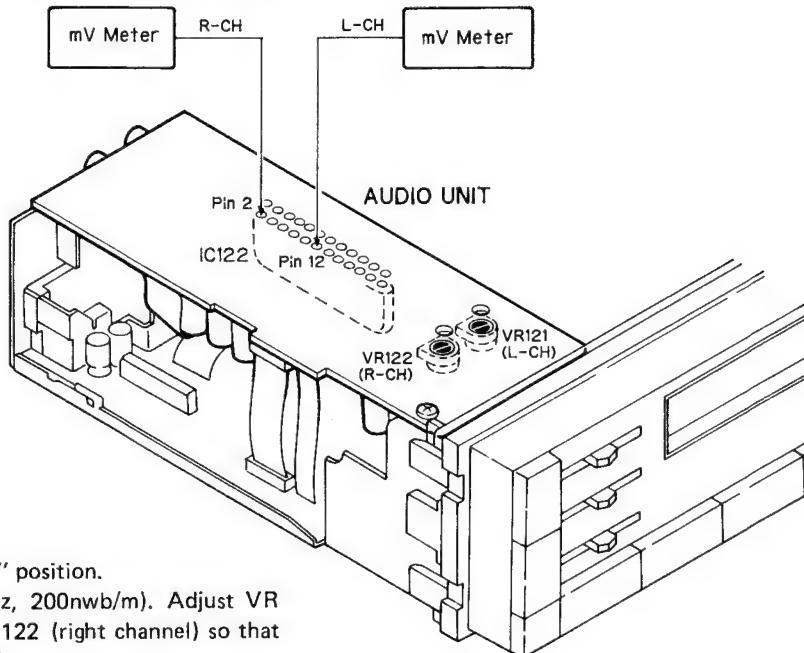
Fig. 34

• To Adjust

1. Set Dolby NR switch in "off" position.
2. Reproduce NCT-150 (400Hz, 200nwb/m). Adjust VR 121 (left channel) and VR 122 (right channel) so that the mV meters show 100 mV.

9.5 DOLBY NR LEVEL ADJUSTMENT (KPX-440)

● Connection Diagram



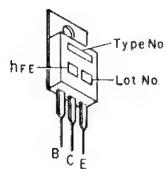
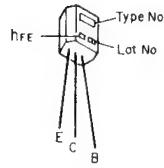
● To Adjust

1. Set Dolby NR switch in "off" position.
2. Reproduce NCT-150 (400Hz, 200nwb/m). Adjust VR 121 (left channel) and VR 122 (right channel) so that the mV meters show 180 mV.

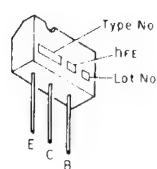
Fig. 35

ICs and Transistors

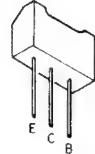
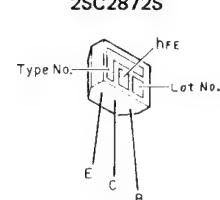
2SD1267

2SA1048
2SC1740S
2SC2458
2SC3113

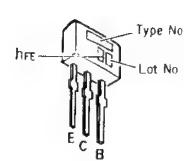
2SC4009F



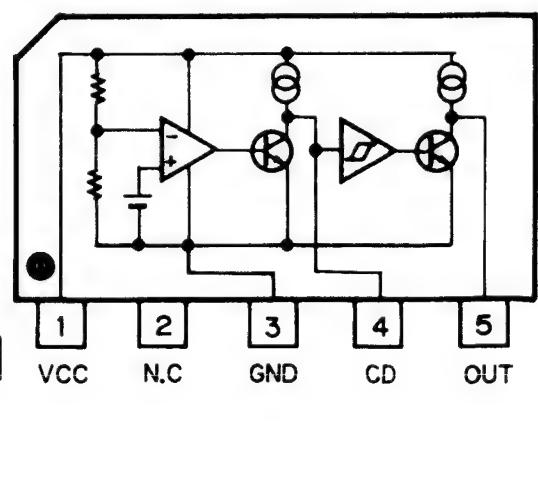
2SA1428

2SA933S
2SA1199S
2SC2872S

2SD1227MF

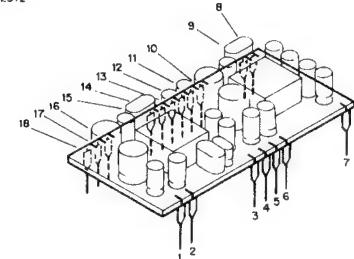
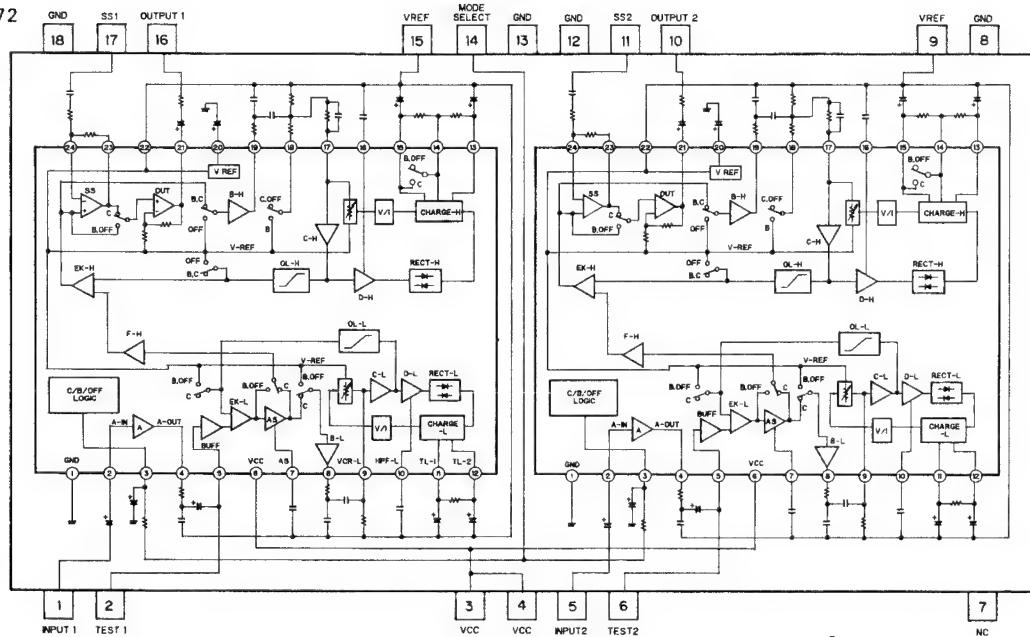


IC1 : TA7375P



KPX-660

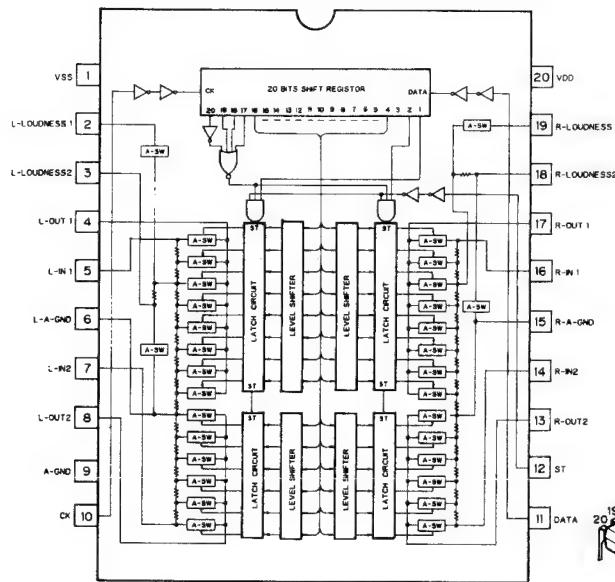
IC121: HH7372
(KPX-660)



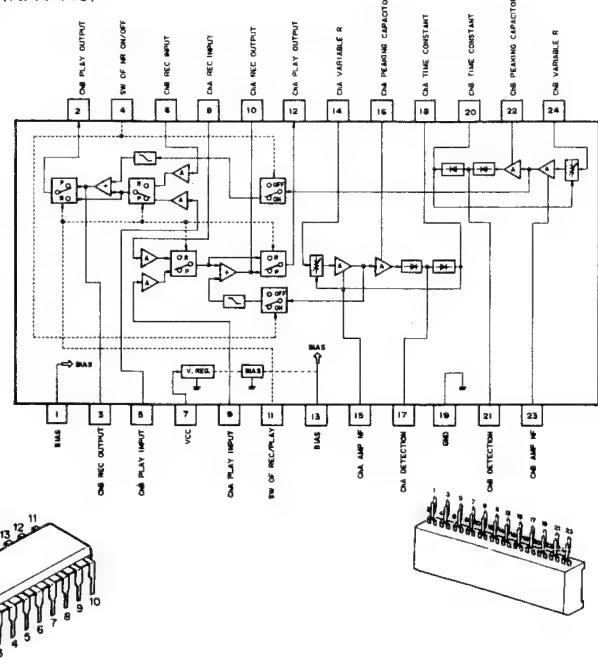
IC7 : TC9177P

In the unit's circuitry, input and output of Lch and Rch are used in reverse.

See page 16 for function of terminals.



IC122 : BA1104LSPK
(KPX-440)



Mark	Symbol & Description	Part No.	Mark	Symbol & Description	Part No.
★ D5, 9		MTZ5R6C or HZS5R6EB3 or RD5R6ES	C54		CEAR15M50LS2
★ D6		HZS5R6JB1 or RD5R6JSB1	C56		CKSQYB223K50
★ D10, 11		1SR-35-100A or ERA15-02	C57		CKSYF224Z25
★ D15		MTZ22JD or HZS22JB2 or RD22JSB2	Audio Unit (KPx-440)		
★ D19	Chip Diode	MA3120	★★ IC122		BA1104LSPK
★ D20	Chip Diode	MA151A	★★ Q121 - 124		2SA1048 or 2SA933S
L1	Choke Coil, 1mH	CTH1005	★★ VR121, 122 Semi-fixed, 33kΩ (B)		CCP-248
X1	Ceramic Oscillator	CSS-042	R121 - 128, 133, 135 - 142		RD1/4PS□□□JL
RESISTORS					
Mark	Symbol & Description	Part No.	★★ R134		RS1/10S□□□J
R3 - 16, 21, 23, 39, 40, 57, 60 - 62, 69, 79 - 86, 116, 119, 120		RS1/10S□□□J	C121, 122		CEA2R2M25NP
R24 - 26, 29 - 31, 37, 41 - 47, 52 - 56, 68, 74, 76, 91, 114		RD1/4PM□□□J	C123, 124, 129, 130		CQMA333J50L
R27, 64		RS1/2P□□□JL	C125, 126		CQMA472J50L
R109		RN1/2P□□□JL	C127, 128		CQMA103J50L
R110		RS1P□□□JL	Display Unit (KPx-440)		
R301, 302		RS1/8S□□□J	★★ C131, 132		CEA0R1M50L2
Other Resistors		RS1/4PS□□□JL	C133, 134		CQMA102J50L
CAPACITORS			C135, 136		CEA4R7M35L2
Mark	Symbol & Description	Part No.	C137, 139		CEA221M10L2
C1, 2		CKSQYB681K50	Bass/Treble Unit (KPx-660, 440)		
C3, 4		CEANL4R7M35LL	★★ D201, 202, 204 - 209, 221 - 215, 219, 224, 226, 228 - 230		SLR-320PG3KL
C5, 6		CEA220M10L2	★★ D216 - 218, 227		SLR-320DU3LM
C7, 8		CKSQYB103K50	★★ IL1 - 3 Lamp, 14V 40mA		CEL-157
C9, 10, 16 - 21		CKSQYB223K25	★★ S201, 202, 204 - 209, 211 Switch		CSG-253
C11		CEA221M10L2	R201		RS1/10S□□□J
C12		CCPCH330J50	R202, 204 - 206, 208		RD1/4PS□□□JL
C13		CKSQYB332K50	R203, 207		RS1/8S□□□J
C14, 29		CEAR22M50LS2	Switch P.C. Board (KPx-660, 440)		
C15, 53, 55 470μF/16V		CCH-114	★★ IC181		μPC4570HA
C22, 23, 34		CEA220M16LS	★★ VR181, 182 Volume, 25kΩ (B) (TREBLE, BASS)		CCS-332
C24, 25		CCSQCH330J50	★★ VR183 Volume, 50kΩ (4B) (BALANCE)		CCS-331
C26		CEA470M16LS	R181 - 185, 187 - 189, 191, 192		RS1/10S□□□J
C27		CEA101M16L2	R186, 190		RS1/8S□□□J
C28, 49		CEA471M6R3L2	C181, 182		CKSYB682K50
C30		CEA101M6R3LS	C183, 184		CKSYB473K25
C31, 32		CEA4R7M35L2	C185, 186		CCSQCH330J50
C33		CEA222M16L2	C187, 188		CEA010M50LS
C35		CKSQYB102K50			
C36		CKSQYB222K50			
C39 - 42, 51, 52		CEA010M50L2	★★ S1 Switch (CST SET)		CSN-089
C43, 44		CKSQYB273K50	★★ S2, 3 Switch (CST IN, 70μS)		CSN-091
C45, 46		CCSQCH331J50	MR1, 2 Magnetic Resistive Device		SDME106A
C47, 48		CQMA102J50L			
C50		CQMA473J50L			

P.C. Board Unit (KPx-660, 440)

Mark	Symbol & Description	Part No.
★ D1, 2		1S1555

Miscellaneous Parts List (KPx-660, 440)

Mark	Symbol & Description	Part No.
★ ★ HD1	(KPx-660) Head Unit	CXA1214
★ ★ HD1	(KPx-440) Head Unit	CXA1123
★ ★ M1	Motor (Head)	CXM-452
★ ★ M2	Motor (Gear)	CXM-351
★ ★ M3	Motor (Capstan)	CXM1007

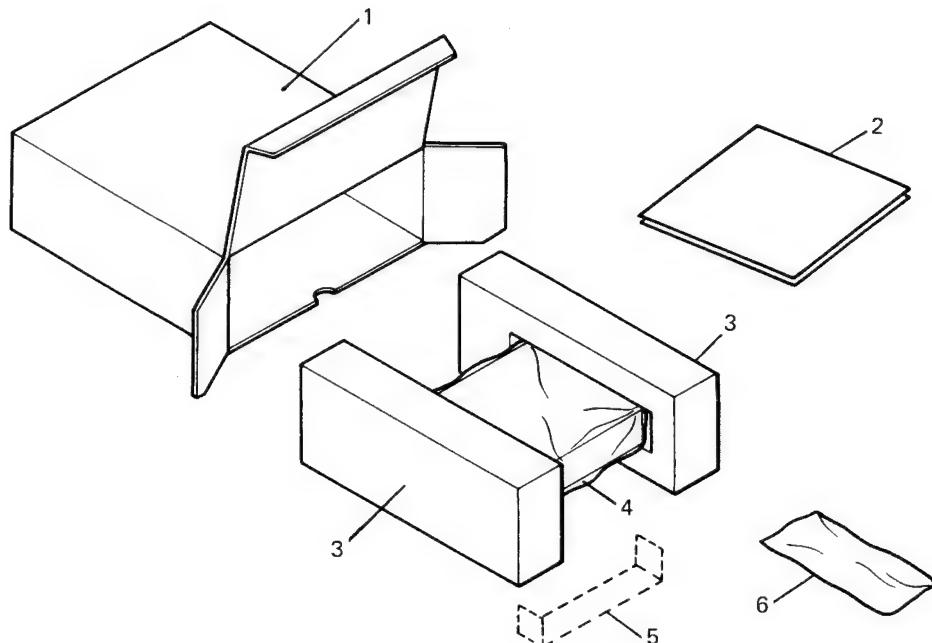
17. PACKING METHOD

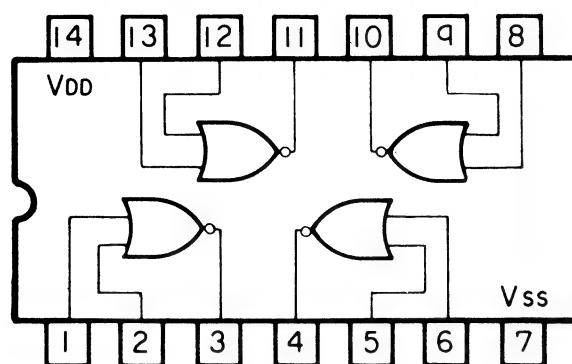
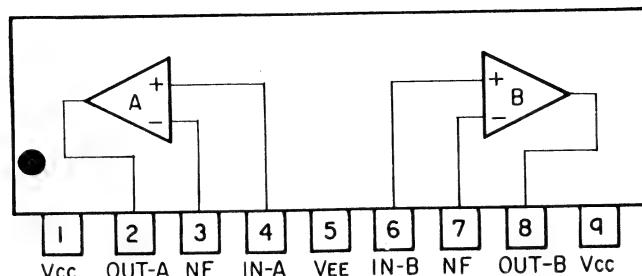
Fig. 42

● Parts List

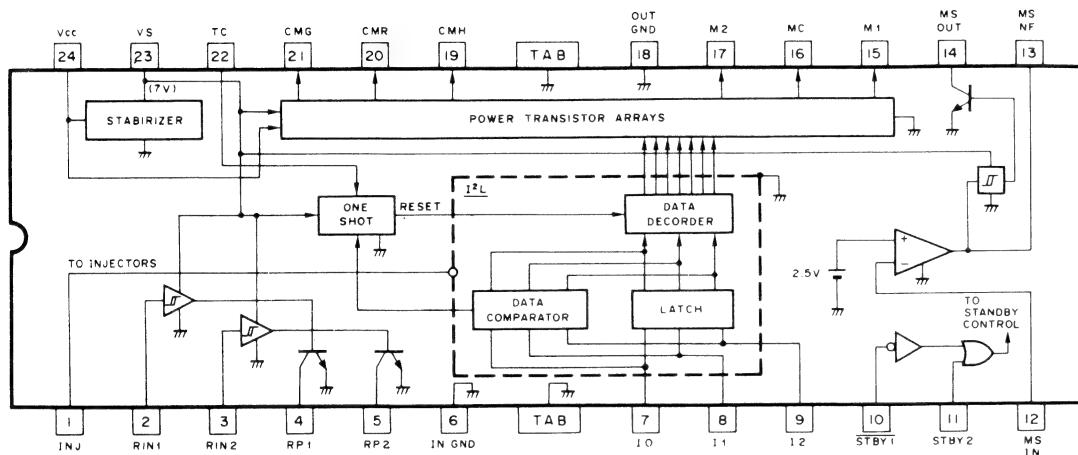
Mark	No.	Part No.	Description	Mark	No.	Part No.	Description
1.	CHG1111	Carton (KPx-660/EW)		6-2.			Double-sided Seal
	CHG1107	Carton (KPx-440/EW)		6-3.	CNF-111		Strap
	CHG1110	Carton (KPx-440/ES)		6-4.			Spacer
2.	CRD1047	Owner's Manual		6-5.			Screw Kit
	CRD1048	Owner's Manual		6-5-1.	CBA-102		Screw
	CRB1045	(KPx-660/EW, KPx-440/EW) Owner's Manual (KPx-440/ES)		6-5-2.	HMF40P080FZK		Screw
		Card (KPx-660/EW, KPx-440/EW)		6-5-3.	HMF40P080FUC		Screw
3.	CHP1021	Styrofoam		6-5-4.	NF50FMC		Nut
4.	CEG-114	Cover					
5.	CNB-723	Mounting Bracket					
6.	CEA1119	Accessory Assy					
6-1		Cord					

6

IC5 : TC4001BP

IC6, 8 : μPC4570HA
IC181 (BASS/TREBLE UNIT)

IC2 : PA3019

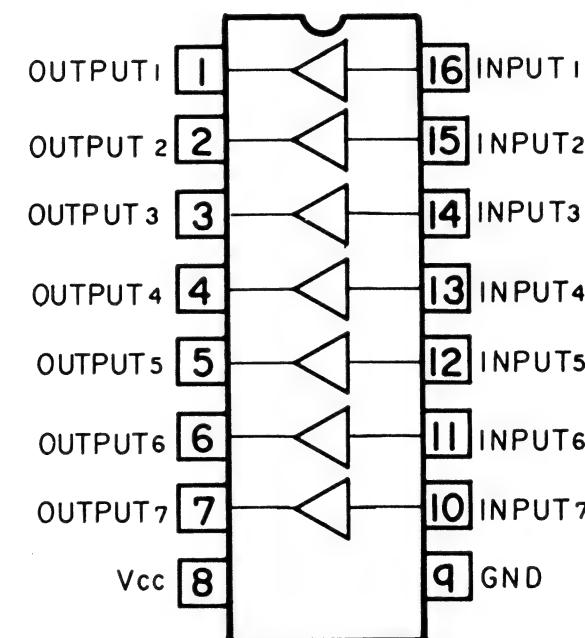


● Pin Function (PA 3019) (Deck Driver)

Pin No.	Pin Name	I/O	Function and Operation
1	INJ	Input	"Internal logic" ($I^2 L$) power source
2	RIN1	Input	Input pin for reel unit rotation sensor (MR-1)
3	RIN2	Input	Input pin for reel unit rotation sensor (MR 2)
4	RP1	Output	Output for wave form signal from reel sensor input 1 (pin 2)
5	RP2	Output	Output for wave form signal from reel sensor input 2 (pin 3)
6	IN GND	—	Low signal system ground pin
7	I0	Input	Motor control logic input pin
8	I1	Input	
9	I2	Input	
10	STBY1	Input	Standby control — switches IC power circuit off at active low (0.7V or less).
11	STBY2	Input	Standby control — switches IC power circuit off at active high (3.5V or more).
12	MSIN	Input	Input (inverted) pin for MS amp.
13	MSNF	Output/ Input	MS amp. output and MS Schmitt circuit input
14	MSOUT	Output	MS Schmitt circuit output — when signal level at MSNF pin exceeds 0 dBm, pulse is outputted open when below 0 dBm

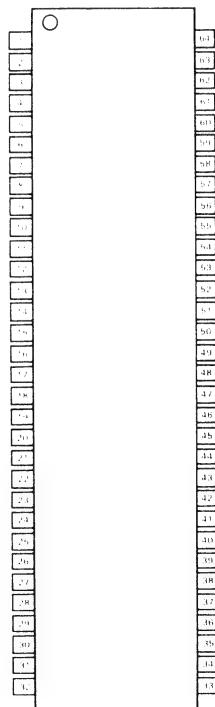
Pin No.	Pin Name	I/O	Function and Operation
15	M1	Output	Drive output "+" pin for head drive motor M1
16	MC	Output	Drive output common pin for motors M1 and M2
17	M2	Output	Drive output "+" pin for drive motor M2 ("FF/REW" switching gear)
18	OUT GND	—	Motor drive circuit ground pin
19	CMH	Output	Drive output H (+) pin for capstan motor M3 output voltage: During speed control: app. V _{CC} –1.7V During loading and eject: 6.9V
20	CMR	Output	Drive output R pin for capstan motor M3 During speed control: open During loading: app. 0V During eject: app. 7V
21	CMG	Output	Drive output GND (–) pin for capstan motor M3 During speed control: app. 0V During loading and eject: open
22	TC	Output	Pin for capacitor for setting timer to switch power transistor off in a set time when logic inputs I0, I1, I2 change.
23	VS	Output	Power source for reel rotation sensor — app. 7V
24	V _{CC}	Input	IC power supply pin

IC9 : BA618

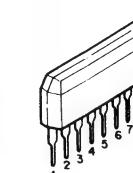
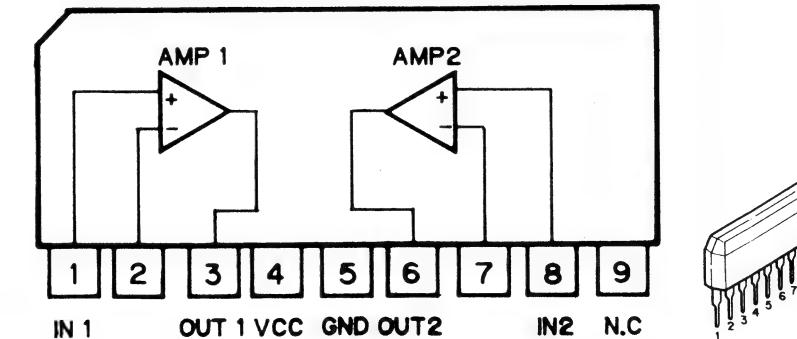


IC's maker by * are MOS type.
Be careful in handling them because they are very liable to be damaged by electrostatic induction.

*IC3 : PD3065B



IC4 : M51954AL

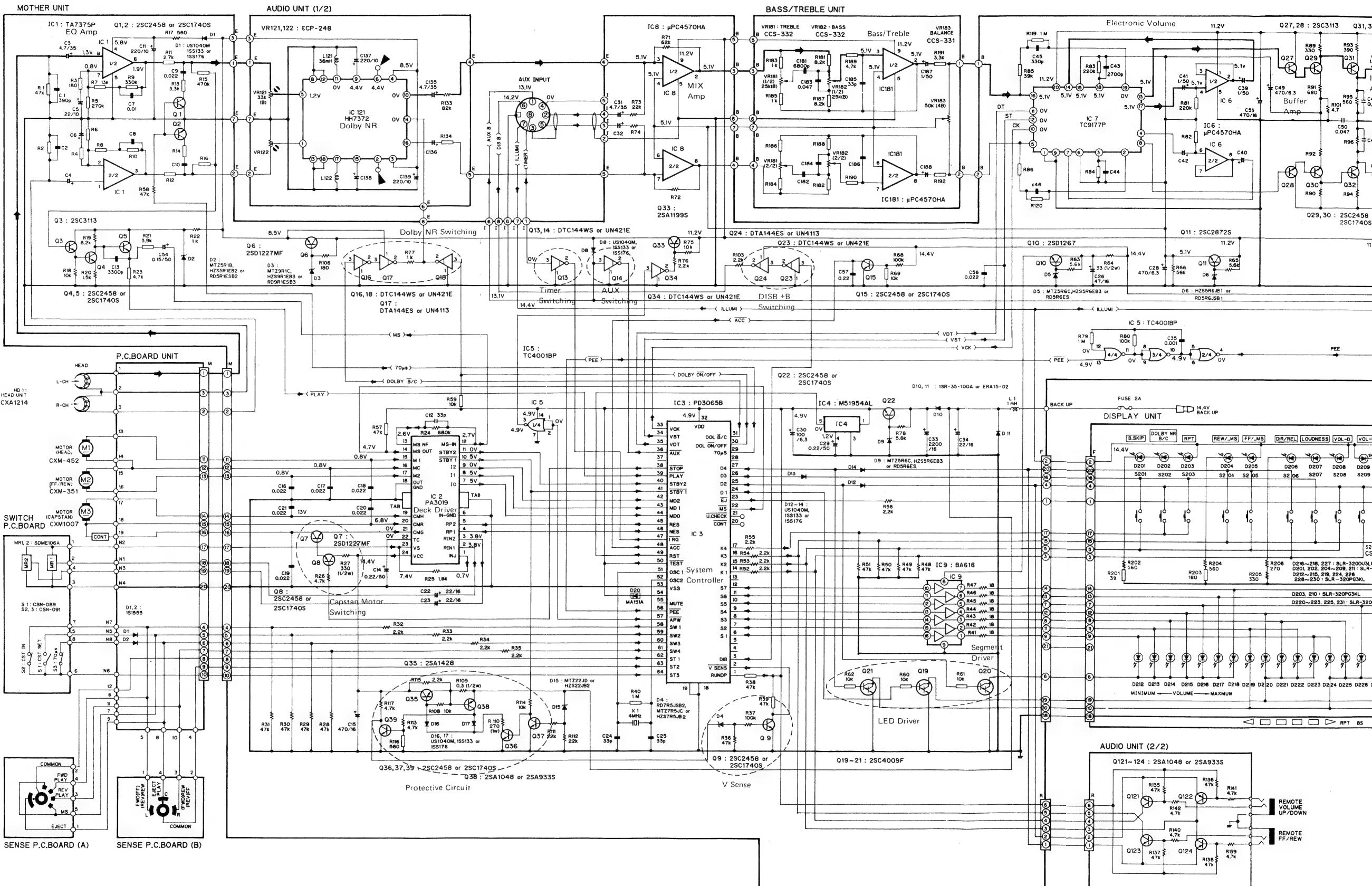


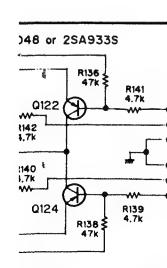
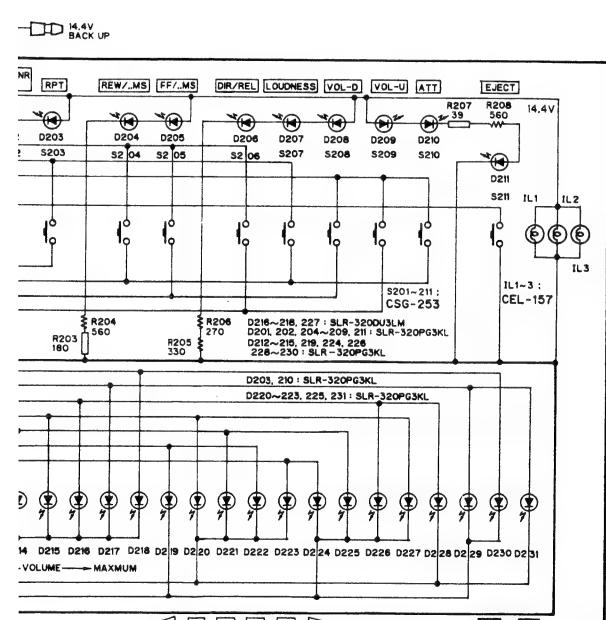
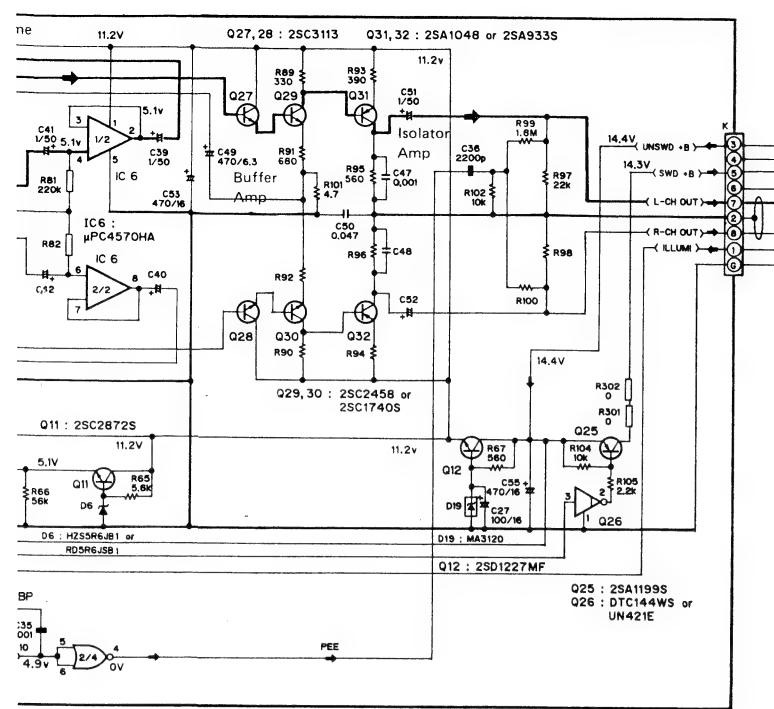
- **PD3065B Terminal Functions**

Terminal	Terminal Name	I/O	Function and Operation
1	RUNDP	Input	Transit DISPLAY select input terminal Pull up (KPx-660) Pull down (KPx-440)
2	V SENS	Input	Voltage detection input terminal "L": normal voltage "H": abnormal voltage decision All operations are disabled when input is "H".
3	DIB	Output	Decibel +B line contrl output. When ACC is on, the lower order systems (external output) are disabled to prevent them starting up before the deck by changing the output to "H". If the deck is OFF, the output is changed to "L" to enable the lower order systems. Output is always "H" when the deck is operating.
4, 5	NC		Not used
6 7 12	S1 S2 S7	Output	Segment output terminal in accordance with the matrix of the digit output.
13	NC		Not used.
14 15 17	K1 K2 K4	Input	Key input terminal in accordance with the matrix of the D2-D4 output.
18, 19			GND
20	CONT	Input	Test terminal.
21	U CHECK	Input	Unit check mode terminal. Enables the test mode in accordance with the following conditions. Pull-up resistance is included. Active L. (1) After power on set: CONT=L, U CHECK=L → IC DC check mode (2) After power on reset: CONT=H, U CHECK=L → unit check mode CONT=H, U CHECK=H → various termers are compressed
22	MS	Input	Music signal input terminal. Externally formed music signals are input here. The internal latch is applied by the fall edge to indicate that music is present.
23	EJ	Input	Eject key input terminal. Active L.
24 25 27	D1 D2 D4	Output	Digit output terminal. Digit output for key scan and display. CMOS output.
28	NC		Not used.
29	70μS	Output	Equalizer switching output terminal. CMOS output. Outputs the "70μS ON/OFF memory" contents when the deck is operating.
30	DOL ON/OFF	Output	Dolby ON/OFF output terminal. Outputs the "Dolby ON/OFF memory" contents when the deck is operating. "L" is output when Dolby is ON.
31	DOL B/C	Output	Dolby B/C selector output terminal. Outputs the "Dolby B/C memory" contents when the deck is operating. Dolby B: "L"; Dolby C: "H".
32	VDD		Power supply terminal. +4.9V.
33	VCK	Output	Volume data clock output terminal.
34	VST	Output	Volume data strobe output terminal.
35	VDT	Output	Volume data output terminal. Volume data output for the electronic volume control IC (TC9177P). CMOS output.
36	AUX	Input	AUX input terminal. When ACC is ON and the AUX terminal is "L", volume related keys and displays are enabled, regardless of the deck status. Active L.
37	NC		Not used.
38	STOP	Output	Capstan motor ON/OFF control output terminal. CMOS output. • Output is "L" when the deck is OFF and a cassette is loading. • Output is "L" while the deck is changing from FAST FORWARD to PLAY or RELEASE; otherwise, output is "H".

39	PLAY	Output	MS filter switching output terminal for PLAY and FAST FORWARD. • Output is "L" during PLAY when the deck is operating; otherwise, output is "H". • Output is "L" when the deck is OFF or while a cassette is loading.
40	STBY2	Output	Connects to and controls STBY2 of the deck driver IC (PA3019). CMOS output. • Output is "H" only during the IC hard reset interval; otherwise, output is "L".
41	STBY1	Output	Connects to and controls STBY1 of the deck driver IC (PA3019). CMOS output. • Output is always "H" during deck operation; otherwise, output is "L". • "H" (standby release) is output before the control data (MD0-MD2) when the deck starts operating.
42	MD2	Output	Control data output terminal for the deck driver IC (PA3019). CMOS output.
43	MD1		
44	MD0		
45	RES	Input	Reverse reel hub rotation pulse input terminal. Rotation is sensed by H/L alternations. Continuation of the "H" or "L" status for more than 1.2 sec. is considered end of tape.
46	NES	Input	Forward reel hub rotation pulse input terminal. The content is the same as that of pin 45.
47	IRQ	Input	External timer interrupt input terminal. Deck operation is released by inputting "L". Inputting "H" resets from ATSC to PLAY.
48	ACC	Input	Inputs ON/OFF from the ACC switch of the vehicle. Active L.
49	RST	Input	IC initial reset input terminal.
50	TEST	Input	VDD connection.
51	OSC1	Input	4MHz clock oscillator circuit.
52	OSC2		
53	VSS		GND
54			Connect the anti-destruction diode.
55	MUTE	Output	Not used
56	PEE	Output	Key touch sound gate pulse output terminal. CMOS output. When an effective key is pressed, the gate pulse which operates the sound oscillator (IC5) is output.
57	APW	Output	Control terminal for the audio power supply. Active L. Output is "L" during ATSC starts and whenever the deck is operating. CMOS output.
58	SW1	Input	Sensing switch matrix input terminal. The head and gear positions are sensed in accordance with the matrix with the ST1-ST3 strobe signals.
59	SW2		
60	SW3		
61	SW4		
62	ST1	Output	The strobe signal output terminal for the sensing switch matrix.
63	ST2		
64	ST3		

10. SCHEMATIC CIRCUIT DIAGRAM (KPx-660)





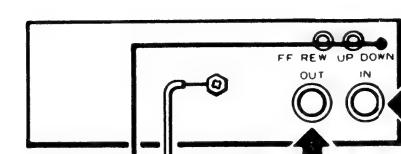
SWITCHES

○ SWITCH P.C. BOARD

- S1 : CST SET SWITCH ON - OFF
- S2 : CST IN SWITCH ON - OFF
- S3 : 70μS SWITCH ON (120μS) - OFF (70μS)

The underlined indicates the switch position.

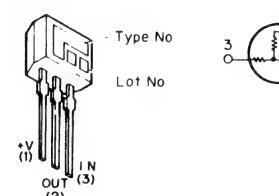
Connection is viewed from the direction of the arrow.



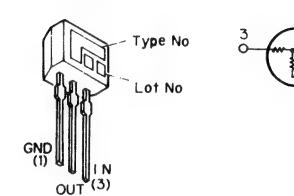
NOTE :

- Indicates a chip resistor.
- Indicates a chip capacitor.
- > Indicates a chip diode.

DTA144ES
UN4113



DTC144WS
UN421E



A

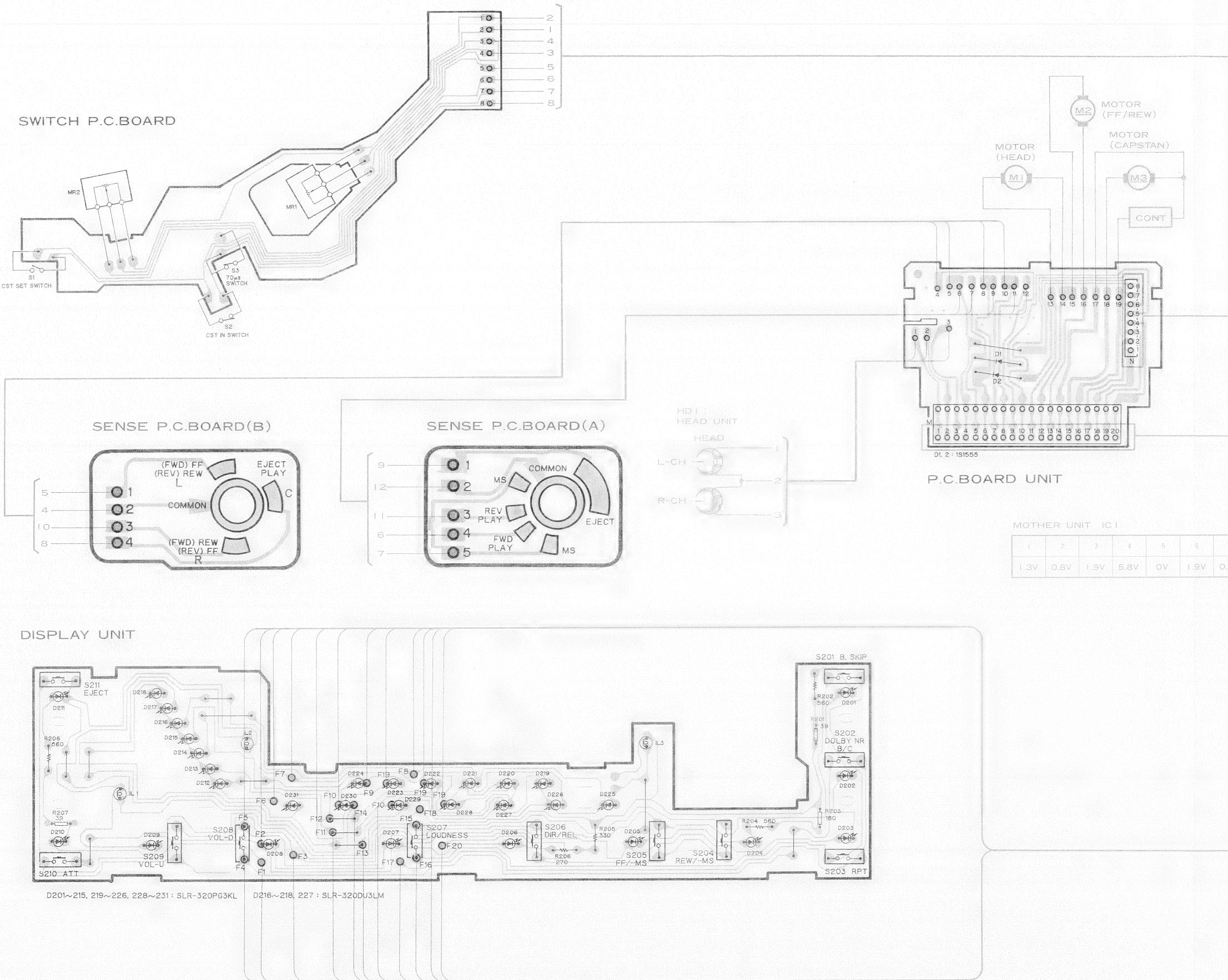
B

C

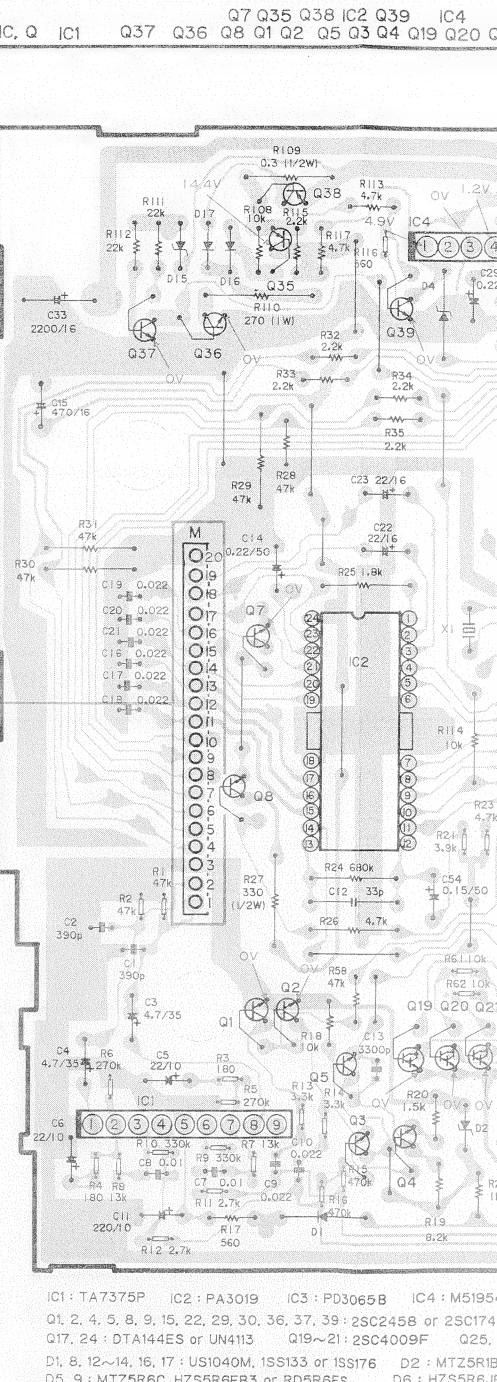
D

Fig. 36

11. CONNECTION DIAGRAM (KPx-660)



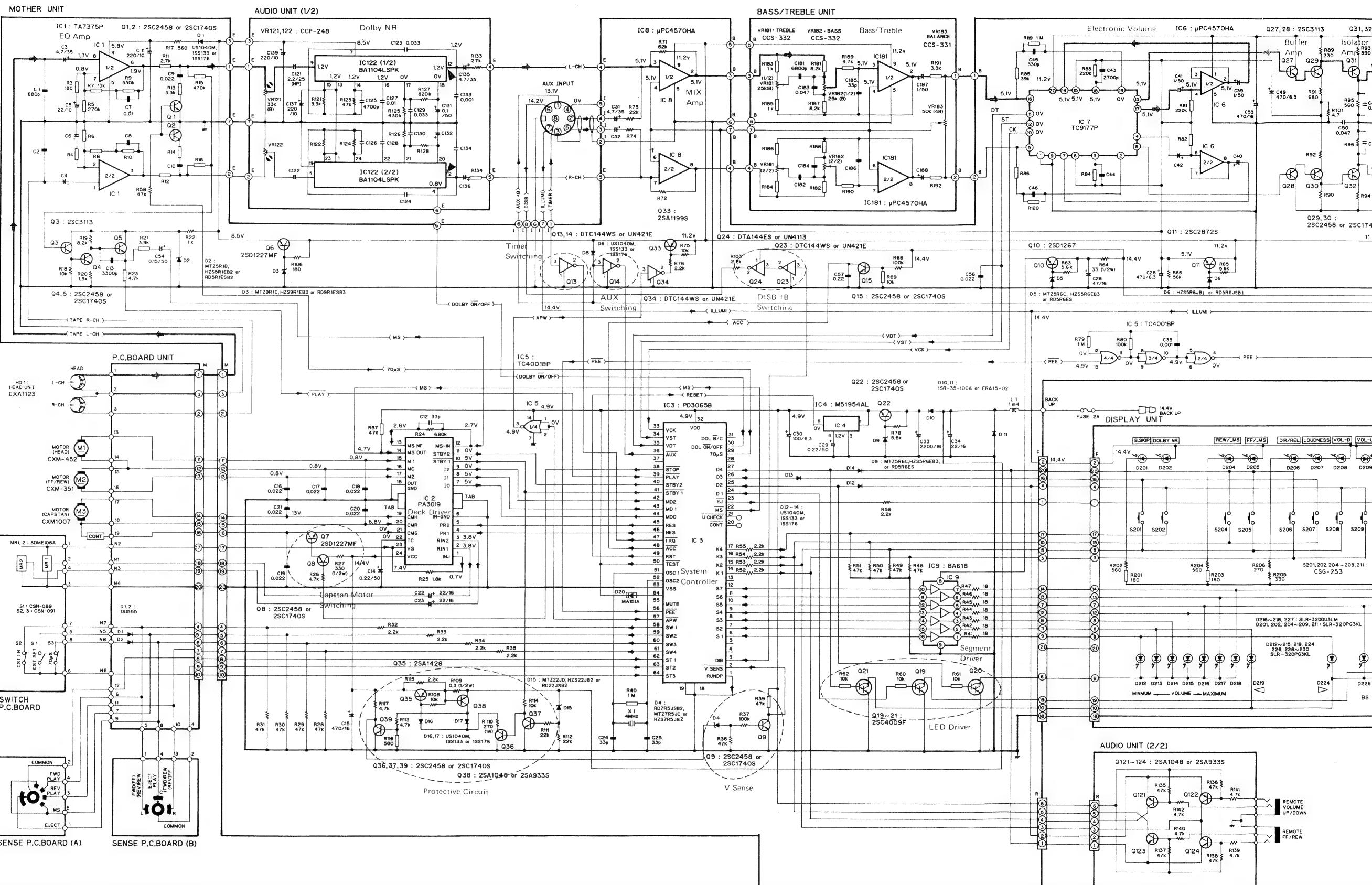
MOTHER UNIT

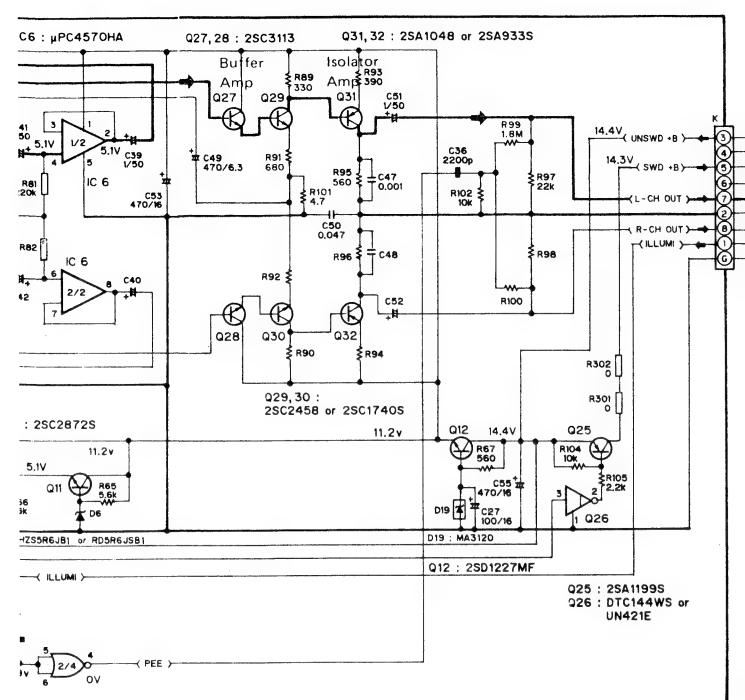


MOTHER UNIT IC2

1	2	3	4	5	6	7
2.6V	4.7V	0.8V	0.8V	0.8V	0V	1.3V

12. SCHEMATIC CIRCUIT DIAGRAM (KPx-440)





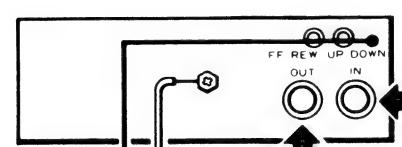
SWITCHES

○ SWITCH P.C. BOARD

SWITCH F.C. BOARD	
S1 : CST SET SWITCH	ON – <u>OFF</u>
S2 : CST IN SWITCH	<u>ON</u> – OFF
S3 : 70 μ s SWITCH	ON (120 μ s) – OFF (70 μ s)

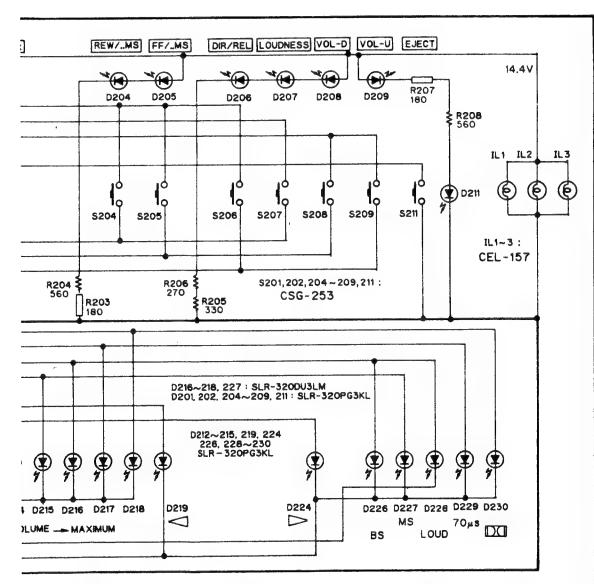
The underlined indicates the switch position

Connection is viewed from the direction of the arrow

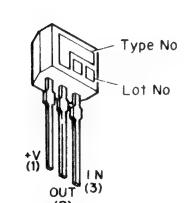


NOTE :

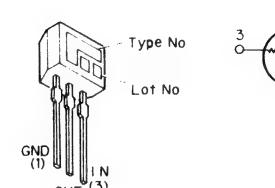
-  Indicates a chip resistor.
- Indicates a chip capacitor.
- Indicates a chip diode.



DTA144ES
UN 4113



DTC144WS
UN 421E



13. CONNECTION DIAGRAM (KPx-440)

1

2

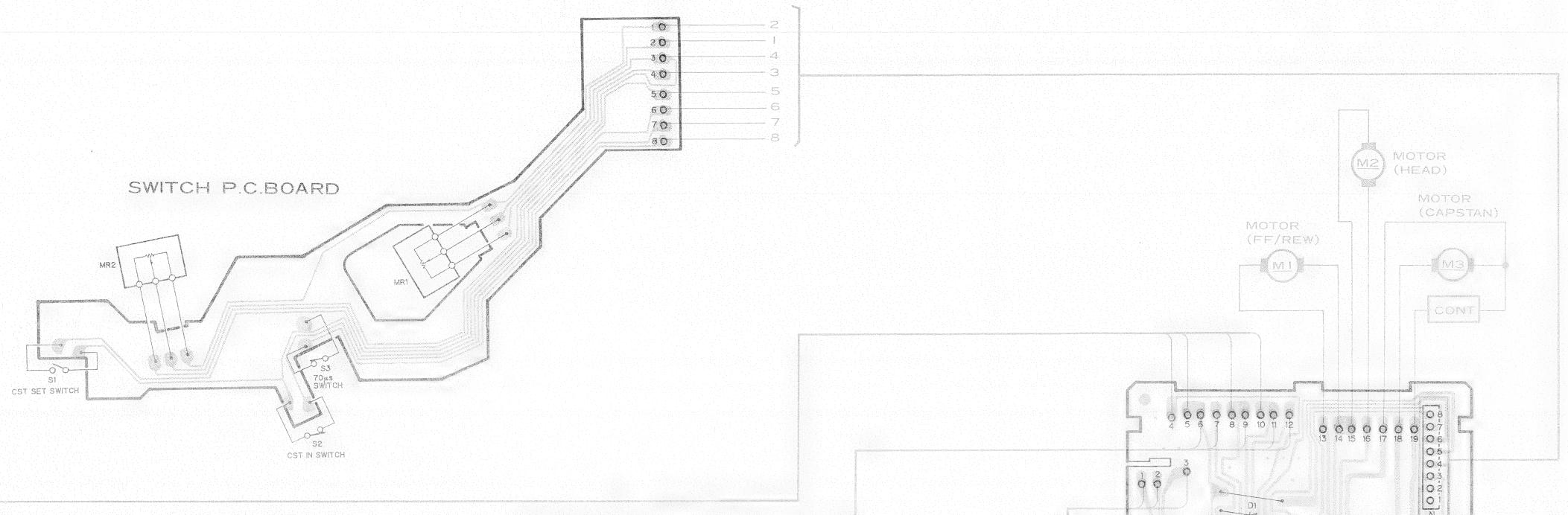
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4

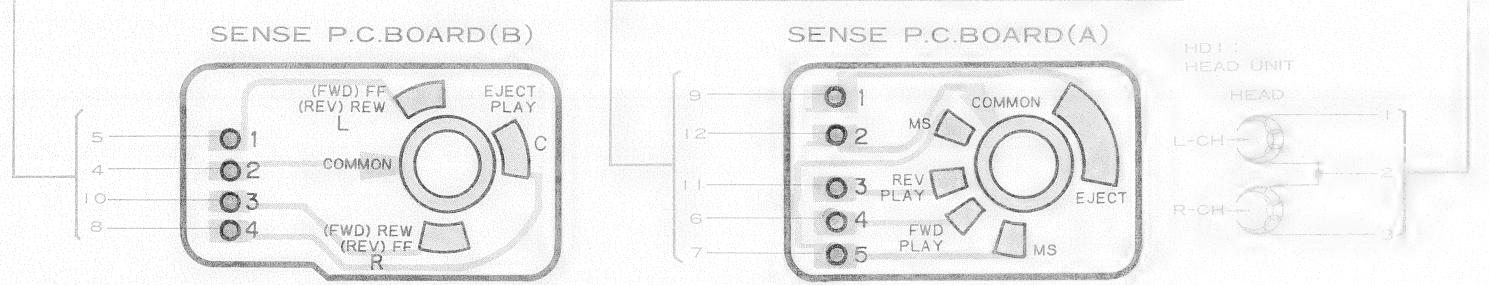
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6

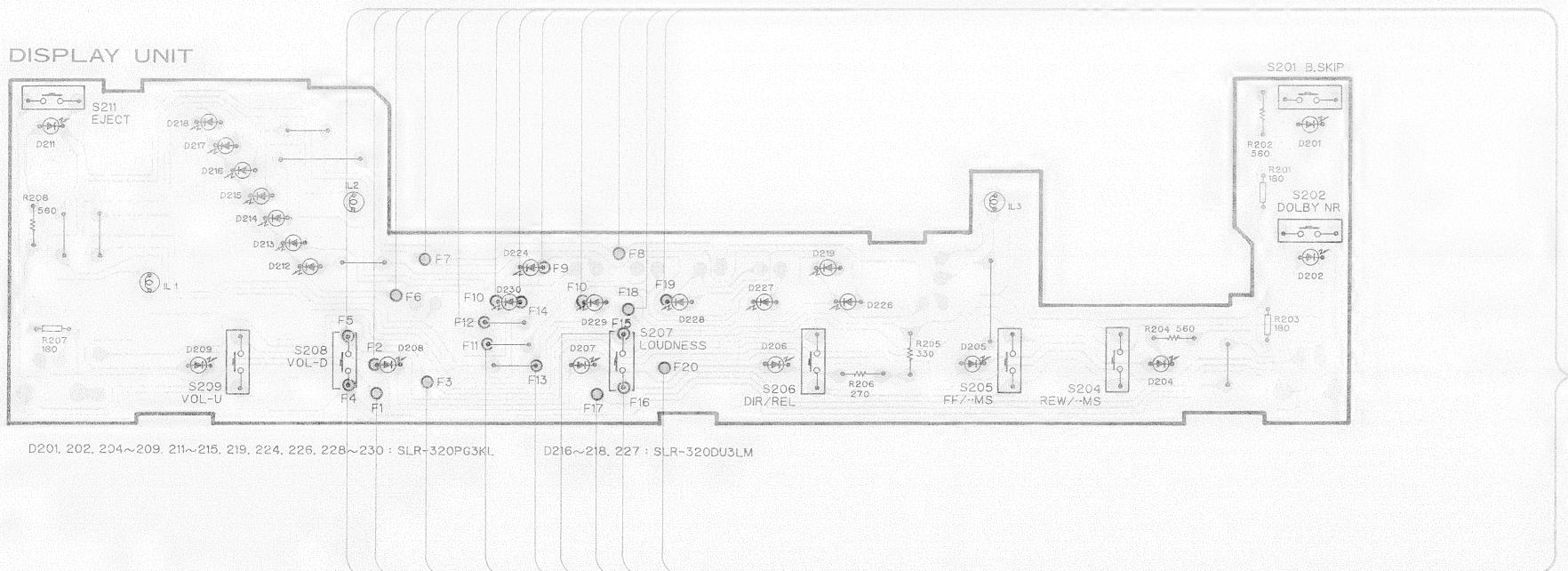
A



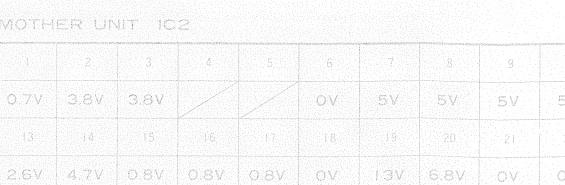
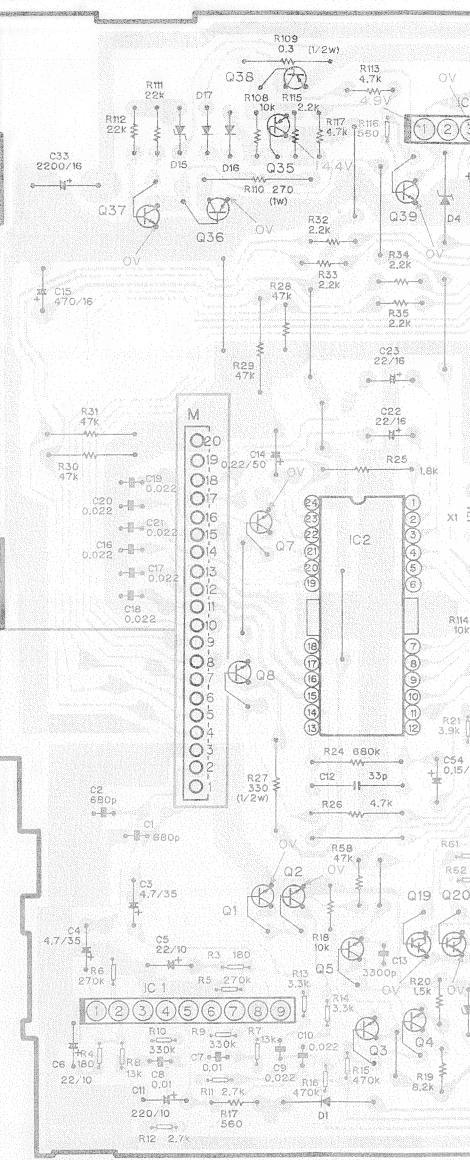
B

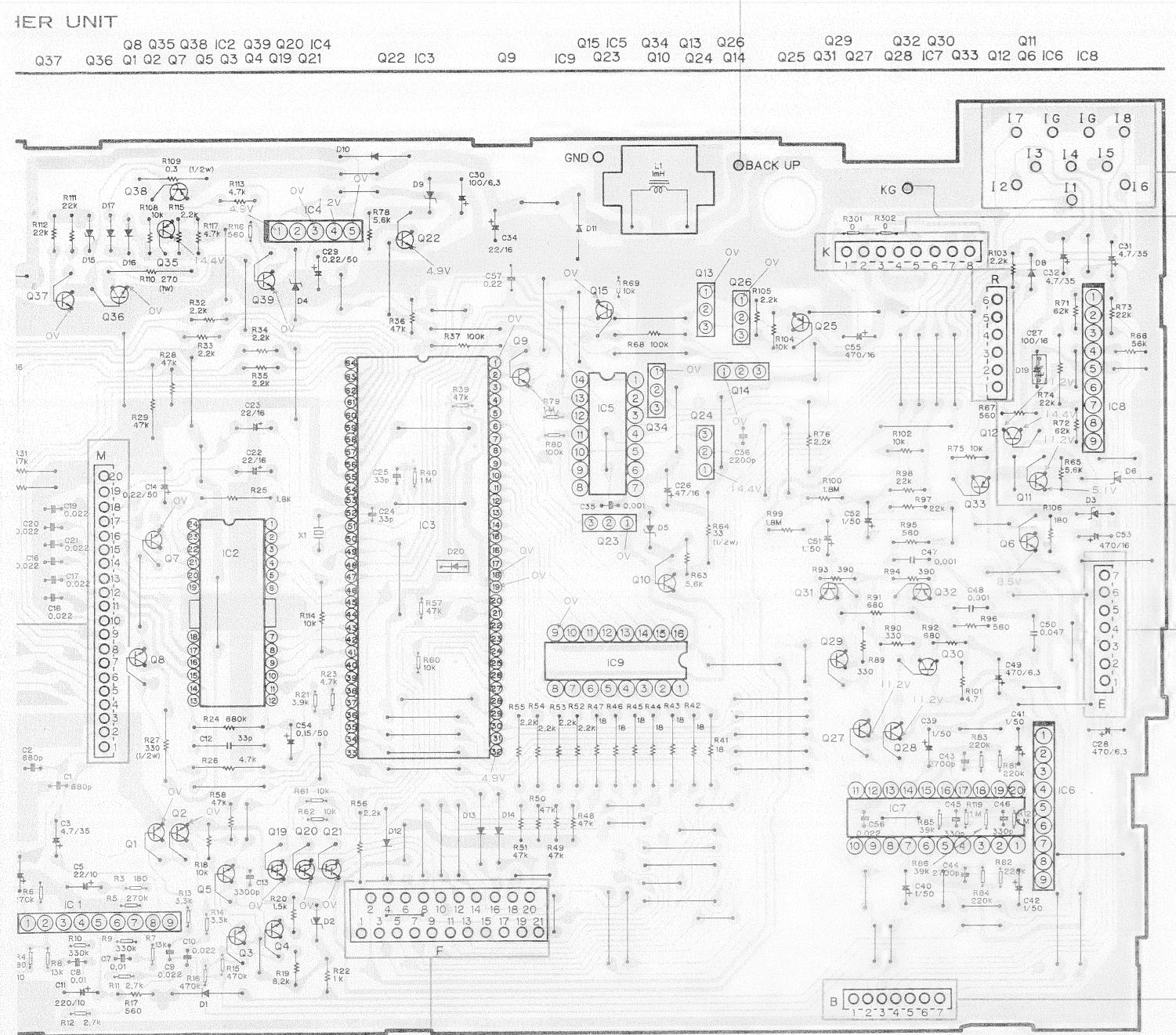


C

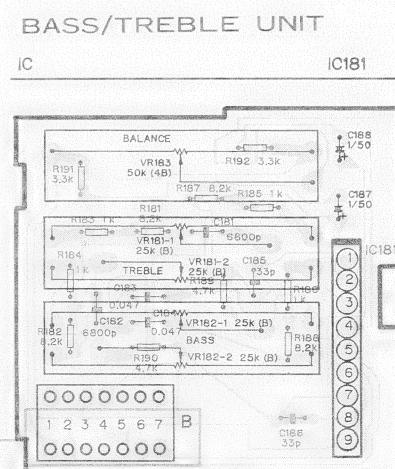


D





A7375P IC2: PA3019 IC3: PD3065B IC4: M51954AL IC5: TC4001BP IC6, 8: μPC4570HA IC7: TC9177P IC9: BA618
 4, 5, 8, 9, 15, 22, 29, 30, 36, 37, 39: 2SC2458 or 2SC1740S Q3, 27, 28: 2SC3113 Q6, 7, 12: 2SD1227MF Q10: 2SD1267 Q11: 2SC2872S Q13, 14, 23, 26, 34: DTC144WS or UN421E
 DTA144E5 or UN4113 Q25, 33: 2SA1995 Q31, 32, 38: 2SA1048 or 2SA933S Q19~21: 2SC4009F Q35: 2SA1428
 [2~14, 16, 17: US1040M, ISS133 or ISS176 D2: MTZ5R1B, HZS5R1EB2 or RD5R1ESB2 D3: MTZ9R1C, HZS9R1EB3 or RD9R1ESB3 D4: RD7R5JSB2, MTZ7R5JC or HZS7R5JB2
 : MTZ5R6C, HZS5R6EB3 or RD5R6ES D6: HZS5R6JB1 or RD5R6JSB1 D10, 11: 1SR-35-100A or ERA15-02 D15: MTZ22JD, HZS22JB2 or RD22JSB2 D19: MA3120 D20: MA151A



IC122 : BA1104LSPK
0121~124 : 2SA1048 or 2SA933S

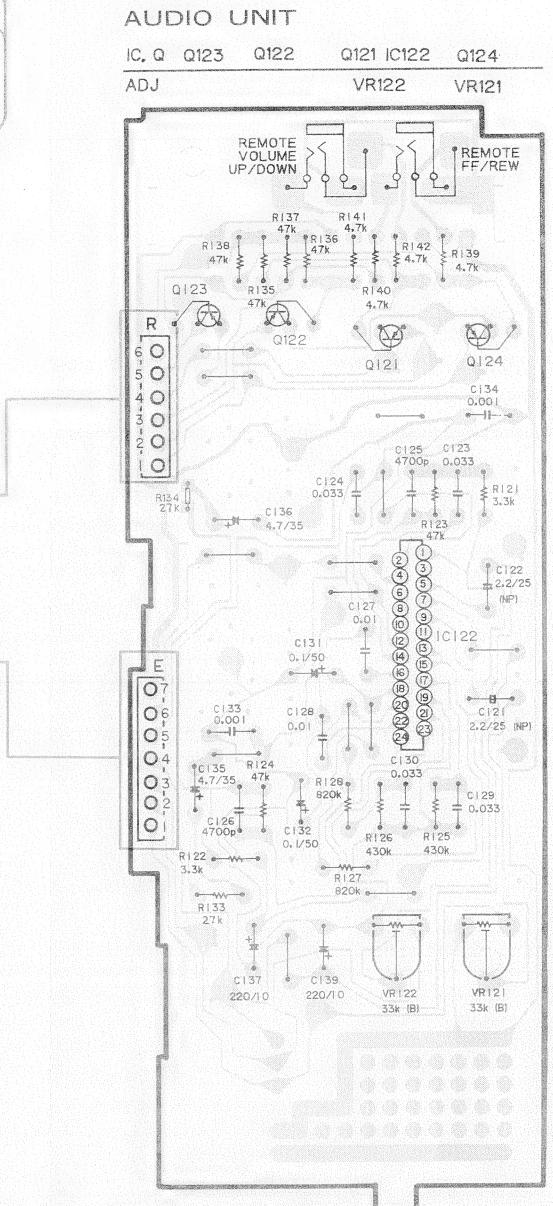
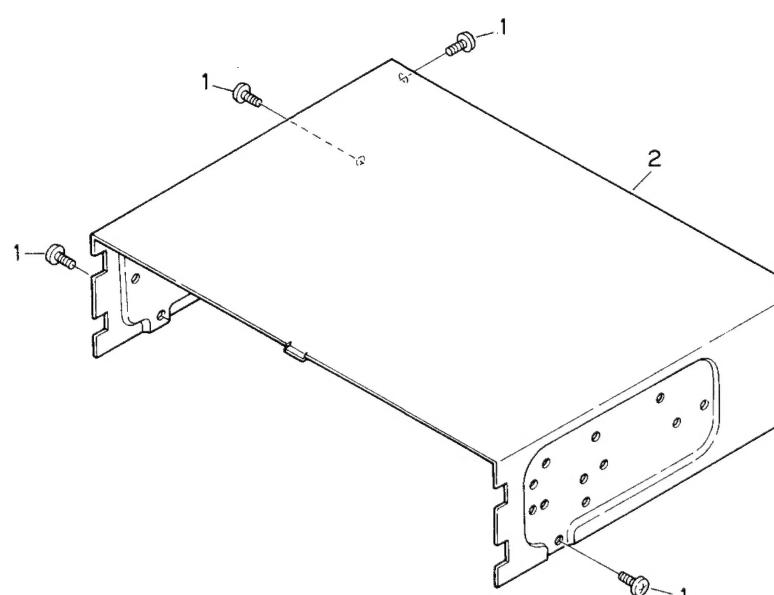


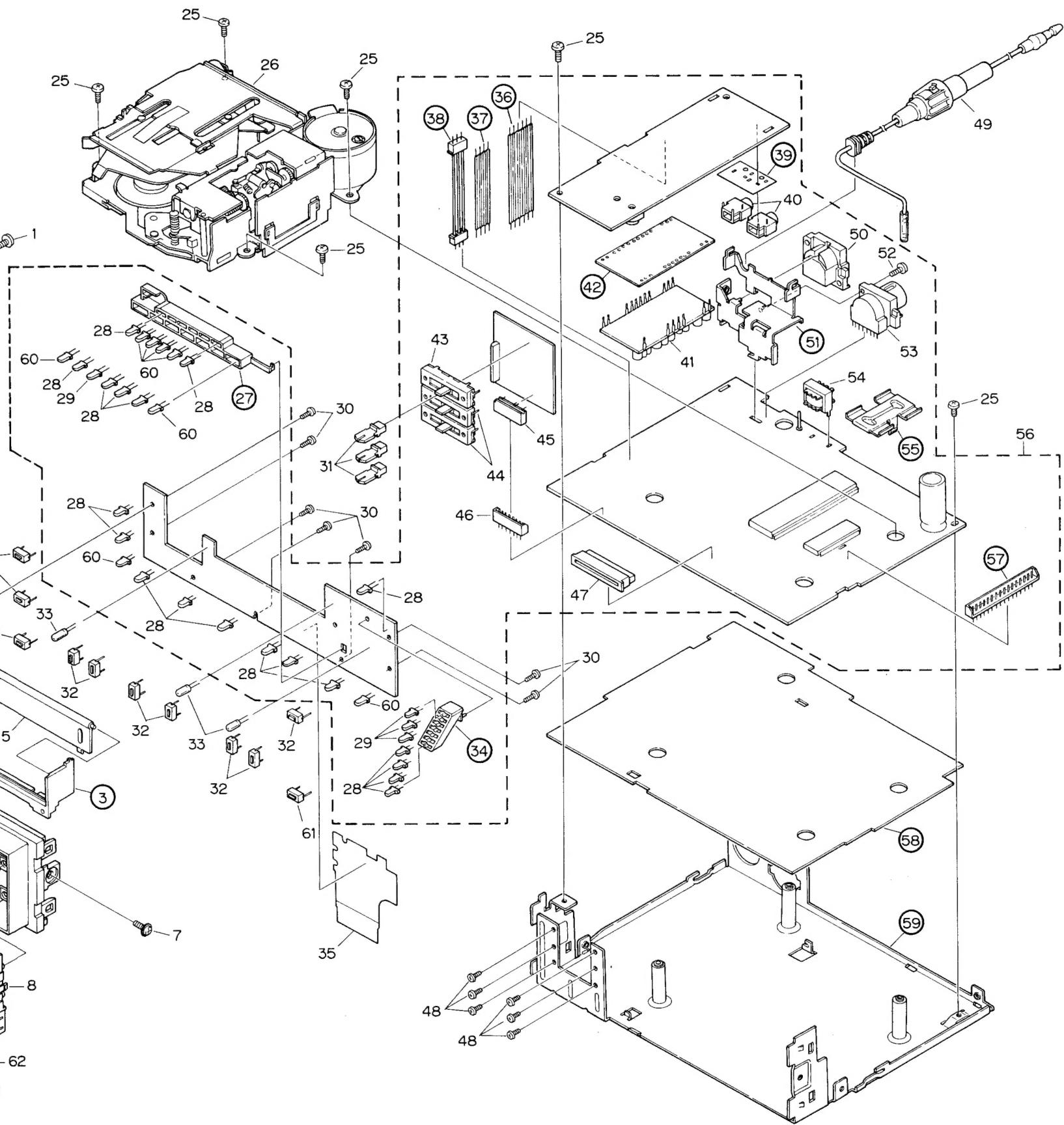
Fig. 39

14. CABINET EXPLODED VIEW

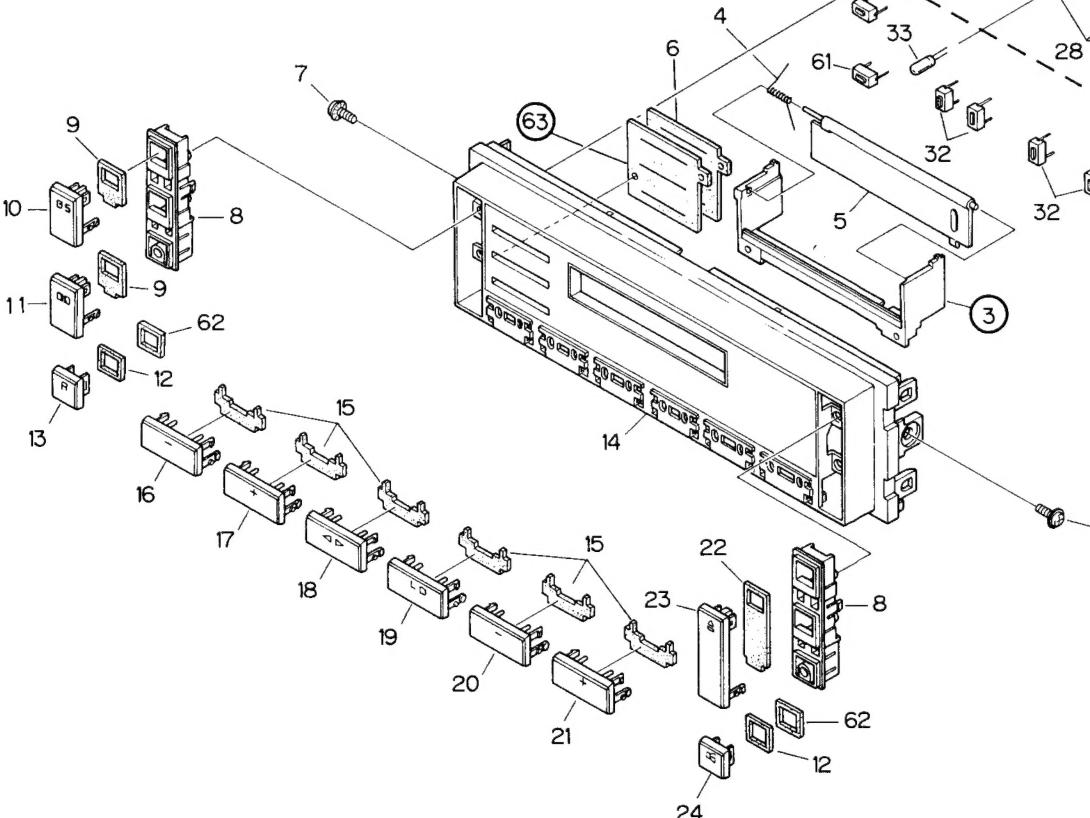
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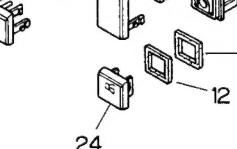
B



C



D



NOTE:

- For your parts marks ★★ and ★★★
- ★★: GENERAL
This classification is for parts that are common to many model numbers.
- Parts whose numbers are longer than one digit.
- Parts marked with ★★★★★

● Parts List

Mark	No.
1.	1.
2.	2.
3.	3.
4.	4.
5.	5.
6.	6.
7.	7.
8.	8.
9.	9.
10.	★ 10.
11.	★ 11.
12.	★ 12.
13.	★ 13.
14.	★ 14.
15.	★ 15.
16.	★ 16.
17.	★ 17.
18.	★ 18.
19.	★ 19.
20.	★ 20.
21.	★ 21.
22.	★ 22.
23.	★ 23.
24.	★ 24.
25.	★ 25.
26.	● 26.
27.	● 27.
28.	★ 28.
29.	★ 29.
30.	★ 30.
31.	★ 31.
32.	★★ 32.

Fig. 40

NOTE:

- For your parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.

★★: GENERALLY MOVES FASTER THAN ★.
This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

A

- Parts whose parts numbers are omitted are subject to being not supplied.
- Parts marked by "●" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

● Parts List

Mark	No.	Part No.	Description	Mark	No.	Part No.	Description	
1.	CBA-178	Screw	★★	33.	CEL-157	Lamp, 14V 40mA		
2.	CNB1043	Case		34.		Holder		
3.		Lens		35.	CNP1144	P.C. Board		
4.	CBH1075	Spring		36.		Connector		
5.	CAT1023	Door Unit (KPX-660)		37.		Connector		
B	CAT1022	Door Unit (KPX-440)		38.		Connector		
6.	CNM1163	Cover		39.		Fiber Glass		
7.	PMS30P050FMC	Screw		40.	HKN151	Jack		
8.	CNV1202	Holder	★★	41.	HH7372	IC (KPX-660)		
9.	CNM1249	Cushion			VACANT	(KPX-440)		
★ 10.	CAC1132	Button (B. SKIP)		42.		P.C. Board (KPX-660)		
★ 11.	CAC1142	Button (KPX-660)			VACANT	(KPX-440)		
★ 12.	CAC1143	Button (KPX-440)		★★ 43.	CCS-331	Volume (BALANCE)		
	CNM1250	Cushion (KPX-660)		★★ 44.	CCS-332	Volume (TREBLE, BASS)		
	CNV1219	Spacer (KPX-440)		45.	CKS-665	Connector		
★ 13.	CAC1134	Button (KPX-660)		46.	CKS-646	Connector		
★ 14.	CAC1144	Button (KPX-440)		47.	CKS1090	Connector		
	CXA1353	Grille Unit (KPX-660)		48.	BMZ20P030FBK	Screw		
	CXA1354	Grille Unit (KPX-440)		★ 49.	CDE1183	Cord		
	CNM1161	Cushion		50.	CKS-549	Connector		
C	★ 16.	CAC1135	Button (REW)		51.		Holder	
★ 17.	CAC1136	Button (FF)		52.	BMZ20P050FMC	Screw		
★ 18.	CAC1137	Button (DIR/REL)		53.	CKS1145	Connector		
★ 19.	CAC1138	Button (LOUDNESS)		54.	CTH1005	Choke Coil		
★ 20.	CAC1139	Button (VOL-D)		55.		Heat Sink		
★ 21.	CAC1140	Button (VOL-U)	●	56.	CWX1030	Control Assy (KPX-660/EW)		
22.	CNM1160	Cushion	●	57.	CWX1029	Control Assy (KPX-660/ES)		
★ 23.	CAC1130	Button (EJECT)	●	58.	CWX1032	Control Assy (KPX-440/EW)		
★ 24.	CAC1141	Button (KPX-660)	●	59.	CWX1031	Control Assy (KPX-440/ES)		
★	CAC1145	Button (KPX-440)		60.	SLR-320PG3KL	Connector		
	25.	BMZ26P050FMC	Screw	61.	VACANT	Insulator		
● 26.	CXK1635	Cassette Mechanism Assy			VACANT	Chassis Unit		
● 27.	CXK1630	Cassette Mechanism Assy		62.	SLR-320PG3KL	LED (KPX-660)		
★ 28.	SLR-320PG3KL	Holder			VACANT	(KPX-440)		
D	★ 29.	SLR-320DU3LM	LED	★★ 61.	CSG-253	Switch (KPX-660)		
30.	PPZ20P060FMC	Screw		63.				
★ 31.	CAA1028	Knob (KPX-660)			VACANT	(KPX-660)		
★ 32.	CAA1042	Knob (KPX-440)			Cover			
★★ 32.	CSG-253	Switch						

15. CASSETTE MECHANISM ASSEMBLY EXPLODED VIEW

● Parts List

Mark	No.	Part No.	Description	Mark	No.	Part No.	Description
1.	HBA-147	Screw, M1.4 x 1.4		56.		Clamper	
2.	BMZ20P040FMC	Screw		57.	CXA1015	Flywheel	
3.		Bush		★★ 58.	CNT-111	Belt	
4.		Spring		59.		Insulator	
5.	CBH-367	Spring		60.		Insulator	
6.	CBH-837	Spring		61.	BMZ20P030FMC	Screw	
7.		Arm		62.		Cover	
8.		Holder Unit		63.	CBH-831	Spring	
9.	CXD-900	Gear Unit		64.	CBH-833	Spring	
10.	HBF-119	Washer		★★ 65.	CXM1007	Motor (Capstan)	
11.	CNV1075	Gear		66.	CBA-165	Screw, M2 x 25	
12.	CBA1004	Screw, M2 x 6		67.		Guide	
13.	CNY-271	Gear		68.		Spacer	
14.	CBF-126	Washer		★★ 69.	CXM-452	Motor (Head Position)	
15.	CBH-835	Spring		70.		Bracket Unit	
16.	CBG1001	E type Washer		71.	HBA-244	Screw, M1.4 x 1.6	
★★ 17.	CXD-387	Pinch Roller Unit		72.	CNW-941	Gear	
18.	CBH-832	Spring		73.	CNY-075	Pulley	
19.	CBH-834	Spring		★★ 74.	CNT-114	Belt	
20.	YE25FUC	Washer		75.	CXM-351	Motor (Gear Position)	
21.	CNW-930	Arm		76.		P.C. Board	
22.	CBF-135	Washer		77.		Bracket	
23.	CNW-932	Collar		78.	CBA-173	Screw, M1.4 x 8	
24.	CBH-827	Spring		79.	CBE-114	Spring	
★★ 25.	CXD-877	Reel Unit		80.	CNY-134	Azimuth Rubber	
26.	CBH-868	Spring		★★ 81.	CXA1214	Head Unit (KPX-660)	
27.		Bracket Unit		★★ 82.	CXA1123	Head Unit (KPX-440)	
28.	CNW-944	Gear		83.	CBH-829	Spring	
29.	CLA1109	Collar		84.	CNW-939	Gear	
★★ 30.	CSN-091	Switch (70μS, CST IN)		84.	YE15FUC	E type Washer	
31.		P.C. Board		85.		Spacer	
★★ 32.	CSN-089	Switch (CST SET)		86.	YE12FUC	E type Washer	
33.	CBA-172	Screw, M1.7 x 5.5		87.	HBF-116	Washer	
34.	CLA1087	Collar		88.	CNW-956	Gear	
35.	SDME106A	Magnetic Resistive Device		89.	CNW-955	Gear	
36.	CBF-046	Washer		90.	CNV1260	Arm	
37.	CBH-887	Spring		91.	CXA1432	Holder Assy	
38.		Arm Unit		92.		Holder	
39.	CBH-886	Spring		93.		Connecotr (8P)	
40.		Arm		94.		P.C. Board	
41.	CNW-931	Arm		95.	CBA1022	Screw, M2 x 2 x 3	
42.	HBF-179	Washer		★ 96.	1S1555	Diode	
43.		Lever		97.	BMZ20P060FMC	Screw	
44.		Chassis Unit		98.	CKS-678	Connector (40P)	
45.		Clamper		99.	CBH-866	Spring	
46.	PMS26P030FMC	Screw		100.	CNW-954	Gear	
47.	CBH-830	Spring		101.	HBA-158	Screw, M1.4 x 5	
48.	HBA-175	Screw, M2 x 2.5		102.	CLB-750	Collar	
49.	CBE-123	Washer		103.	CNH-004	Arm	
50.	CBH-902	Spring		104.	CNY-077	Gear	
51.	HNC-953	Holder		105.	CNY-148	Gear	
52.	CBH-893	Spring		106.	CBF-088	Washer	
53.	CLA1110	Collar		107.	CXA1433	Holder Ass'y	
54.	CNV1178	Gear		108.	HBA-209	Screw, M2 x 2	
55.	CLA1108	Collar					

1

2

3

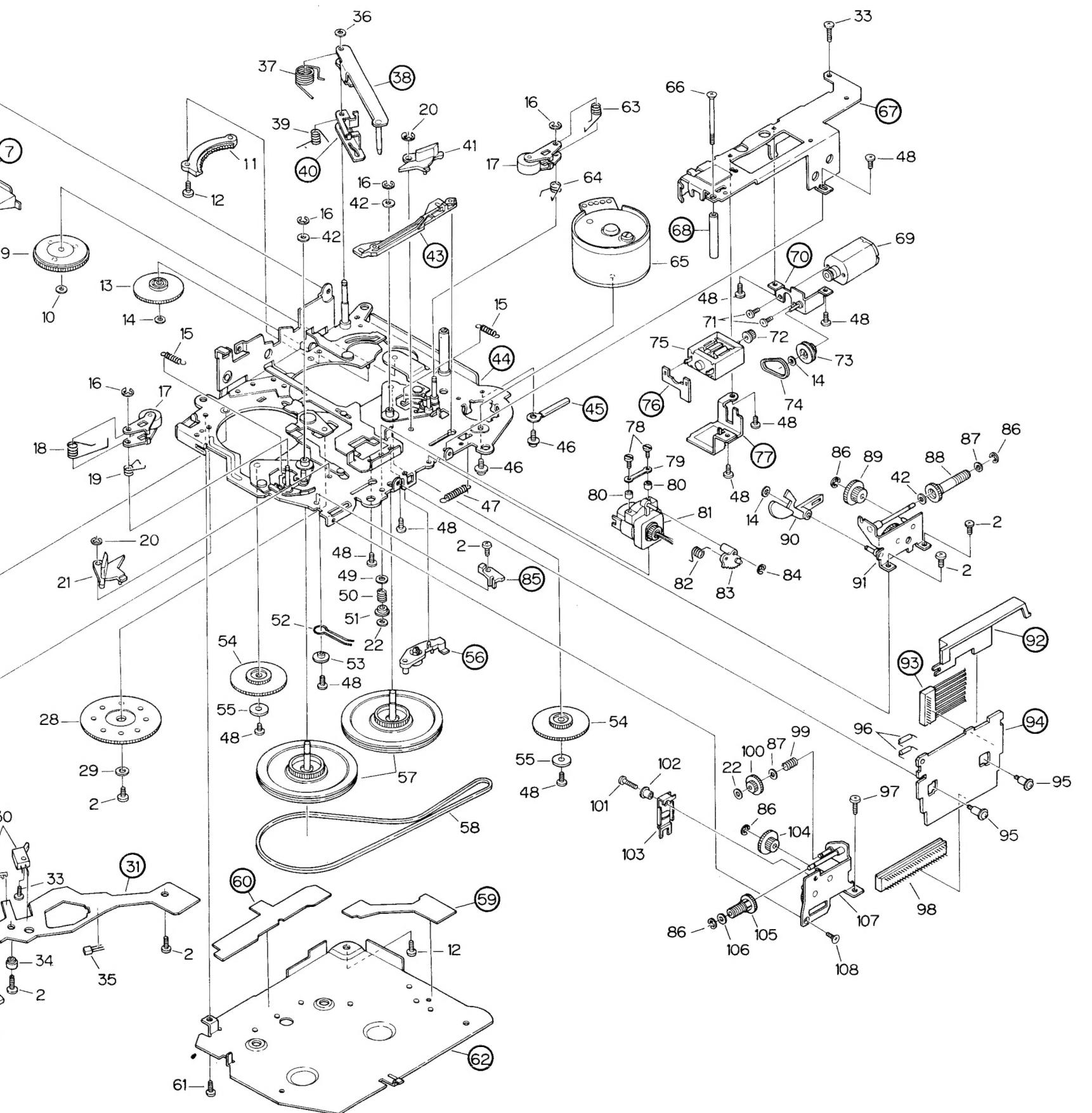
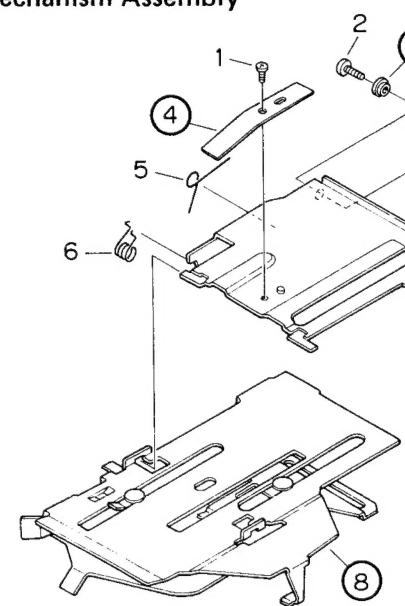
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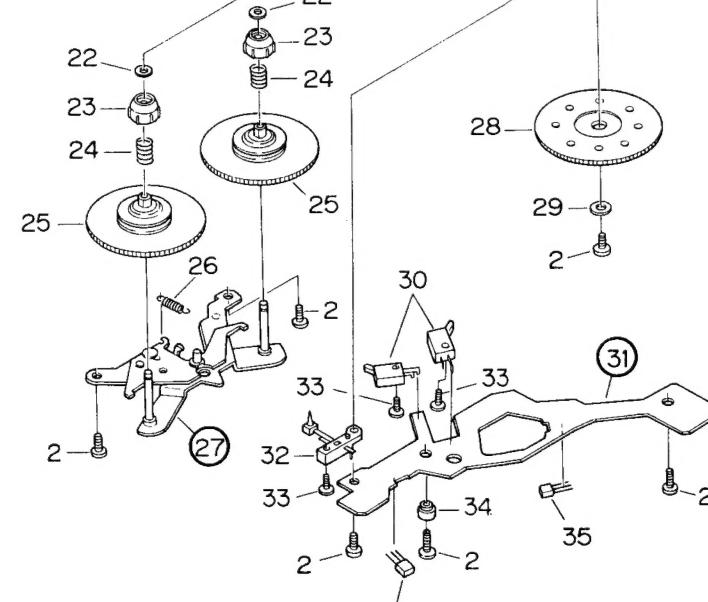
6

• Cassette Mechanism Assembly

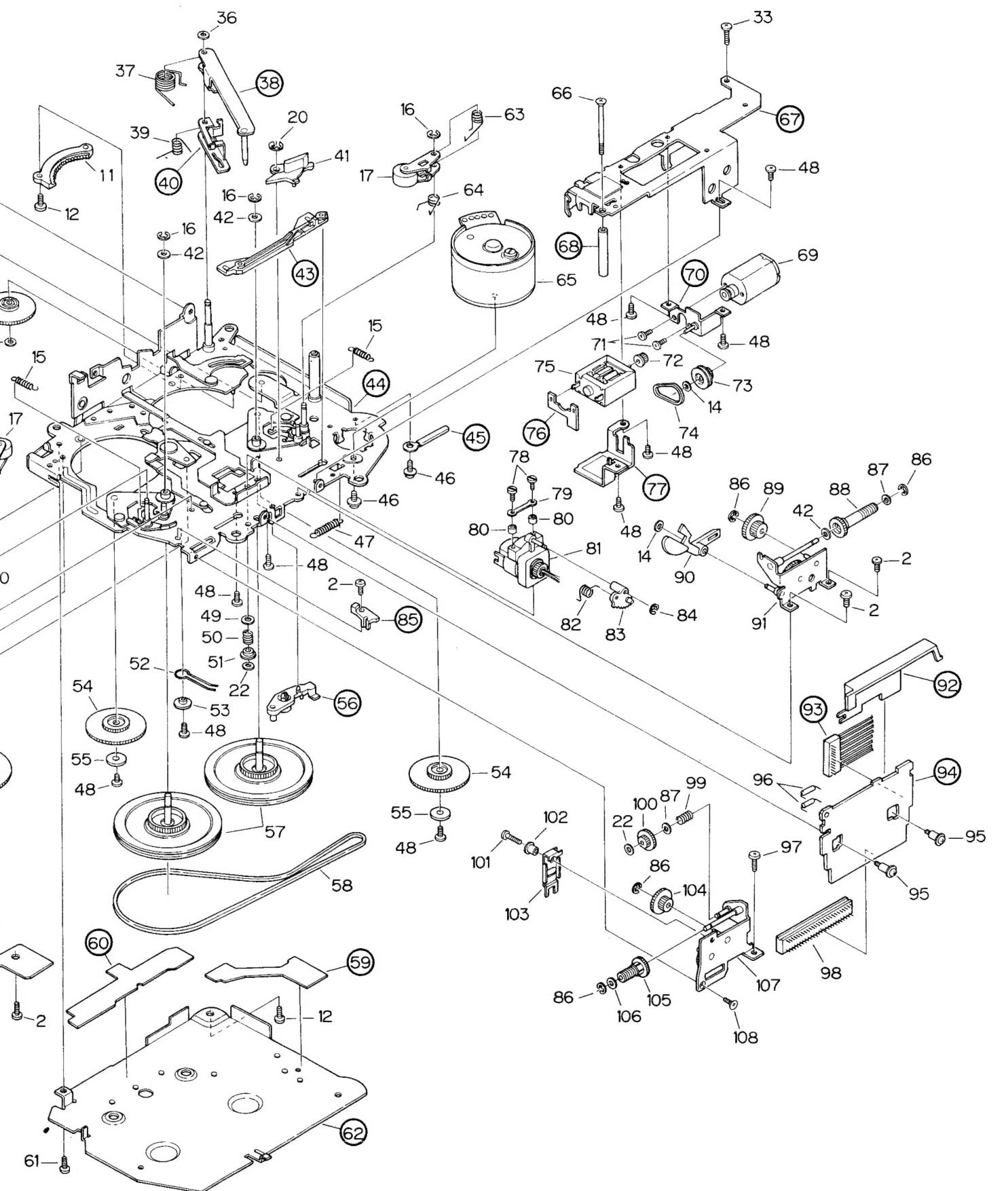
A



B



C



D

A

B

C

D

1

2

3

4

5

6

16. ELECTRICAL PARTS LIST

NOTE:

When ordering resistors, first convert resistance values into code form as shown in the following examples.

Ex. 1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J = 5%, and K = 10%).

560Ω 56 × 10¹ 561 RD1/4PS 5 6 1 J
 47kΩ 47 × 10³ 473 RD1/4PS 4 7 3 J
 0.5Ω 0R5 RN2H 0 0 5 K
 1Ω 010 RS1P 0 1 0 K

Ex. 2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62kΩ 562 × 10¹ RN1/4SR 5 6 2 0 F

• For your parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.

★★: GENERALLY MOVES FASTER THAN ★.

This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

• Parts whose parts numbers are omitted are subject to being not supplied.

• The part numbers shown below indicate chip components.

Chip Resistor

RS1/8S 000J, RS1/10S 000J

Chip Capacitor (except for CQS....)

CKS...., CCS....

Mother Unit (KPx-660)

MISCELLANEOUS

Mark	Symbol & Description	Part No.	Mark	Symbol & Description	Part No.
★★ IC		TA7375P			1SS176
★★ IC2		PA3019	★ D2		MTZ5R1B or HZA5R1EB2 or
★★ IC3		PD3065B			RD5R1ESB2
★★ IC4		M51954AL			MTZ9R1C or
★★ IC5		TC4001BP	★ D3		
★★ IC6, 8		μPC4570HA			HZA9R1EB3 or
★★ IC7		TC9177P			RD9R1ESB3
★★ IC9		BA618	★ D4		RD7R5JSB2 or
★★ Q1, 2, 4, 5, 8, 9, 15, 22, 29, 30, 36, 37, 39		2SC2458 or			MTZ7R5JC or
		2SC1740S			HZA7R5JB2
★★ Q3, 27, 28		2SC3113	★ D5, 9		
★★ Q6, 7, 12		2SD1227MF			MTZ5R6C or
★★ Q10		2SD1267			HZA5R6EB3 or
★★ Q11		2SC2872S	★ D6		RD5R6ES
★★ Q13, 14, 16, 18, 23, 26, 34		DTC144WS or			MTZ5R6JB1 or
					RD5R6JSB1
★★ Q17, 24		UN421E	★ D10, 11		1SR-35-100A or
		DTA144ES or			ERA15-02
★★ Q19 – 21		UN4113	★ D15		MTZ22JD or
★★ Q25, 33		2SC4009F			HZA22JB2
★★ Q31, 32, 38		2SA1199S	★ D19	Chip Diode	MA3120
★★ Q35					
★ D1, 8, 12 – 14, 16, 17			★ D20	Chip Diode	MA151A
				L1	Choke Coil, 1mH
				X1	Ceramic Oscillator
		1SS133 or			CTH1005
					CSS-042

RESISTORS

Mark	Symbol & Description	Part No.	Mark	Symbol & Description	Part No.
R1 – 16, 21, 23, 38 – 40, 57, 59 – 62, 69, 79 – 86, 116, 119, 120		RS1/10S 000J	R133, 135 – 142		RD1/4PS 000JL
R24 – 26, 29 – 31, 41 – 47, 52 – 56, 68, 74, 76, 91, 114		RD1/4PM 000J	R134		RS1/10S 000J

Mark	Symbol & Description	Part No.
R27, 64		RS1/2P 000JL
R37		RD1/4PS 000JL
R109		RN1/2P 000JL
R110		RS1P 000JL
R301, 302		RS1/8S 000J
Other Resistors		RD1/4PS 000JL

Display Unit (KPx-660)

Mark	Symbol & Description	Part No.
★ D201 – 215, 219 – 226, 228 – 231		SLR-320PG3KL
★ D216 – 218, 227		SLR-320DU3LM
★ IL1 – 3 Lamp, 14V 40mA		CEL-157
★★ S201 – 211 Switch		CSG-253
R201		RS1/10S 000J

CAPACITORS

Mark	Symbol & Description	Part No.
C1, 2		CKSQYB391K50
C3, 4		CEANL4R7M35LL
C5, 6		CEA220M10L2
C7, 8		CKSQYB103K50
C9, 10, 16 – 21, 56		CKSQYB223K25
C11		CEA221M10L2
C12		CCPCH330J50
C13		CKSQYB332K50
C14, 29		CEAR22M50LS2
C15, 53, 55 470μF/16V		CCH-114
C22, 23, 34		CEA220M16LS
C24, 25		CCSQCH330J50
C26		CEA470M16LS
C27		CEA101M16L2
C28, 49		CEA471M6R3L2
C30		CEA101M6R3LS
C31, 32		CEA4R7M35L2
C33		CEA222M16L2
C35		CKSQYB102K50
C36		CKSQYB222K50
C39 – 42, 51, 52		CEA010M50L2
C43, 44		CKSQYB273K50
C45, 46		CCSQCH331J50
C47, 48		CQMA102J50L
C50		CQMA473J50L
C54		CEAR15M50LS2
C57		CKSYF224Z25

Mother Unit (KPx-440)

Mark	Symbol & Description	Part No.
★★ IC1		TA7375P
★★ IC2		PA3019
★★ IC3		PD3065B
★★ IC4		M51954AL
★★ IC5		TC4001BP
★★ IC6, 8		μPC4570HA
★★ IC7		TC9177P
★★ IC9		BA618
★★ Q1, 2, 4, 5, 8, 9, 15, 22, 29, 30, 36, 37, 39		2SC2458 or 2SC1740S
★★ Q3, 27, 28		2SC3113
★★ Q6, 7, 12		2SD1227MF
★★ Q10		2SD1267
★★ Q11		2SC2872S
★★ Q13, 14, 23, 26, 34		DTC144WS or
★★ Q19 – 21		UN421E
★★ Q24		2SC4009F
★★ Q25, 33		DTA144ES or
★★ Q31, 32, 38		UN4113
★★ Q35		2SA1199S
★ D1, 8, 12 – 14, 16, 17		2SA1048 or 2SA933S
★★ Q35		2SA1428
★ D17, 24		US1040M or 1SS133 or
★★ Q19 – 21		1SS176
★★ Q25, 33		MTZ5R1B or
★★ Q31, 32, 38		HZA5R1EB2 or
★★ Q35		RD5R1ESB2
★ D1, 8, 12 – 14, 16, 17		MTZ9R1C or
		HZA9R1EB3 or
		RD9R1ESB3
		RD7R5JSB2 or
		MTZ7R5JC or
		HZA7R5JB2

Audio Unit (KPx-660)

Mark	Symbol & Description	Part No.
★★ IC121		HH7372
★★ Q121 – 124		2SA1048 or
		2SA933S
		CTF1015
	L121, 122 Coil, 36mH	CCP-248
★★ VR121, 122	Semi-fixed, 33kΩ (B)	

Mark	Symbol & Description	Part No.
★ D2		
★ D3		
★ D4		